PARITY PROGRESSION AND BIRTH INTERVAL ANALYSIS AMONG WOMEN RECEIVING HIV CARE IN UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA

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BY

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CERTIFICATION

I certify that this project was duly carried out directly under my supervision and also meets the regulations governing the award of the degree of MPH Medical Demography in the Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan.

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DECLARATION

I hereby declare that this research is original. This work has neither presented to any other faculty for the purpose of the award of degree nor has it been submitted elsewhere for publication purposes.

Signature……..

LAYODE, Temitope Mary

DEDICATION

This project is dedicated to God Almighty, to whom I owe my existence, the one who has been my constant help in time of needs and has given me the grace and opportunity to sojourn through this citadel of great learning.

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LIST OF ABBREVIATIONS

PPR	Parity Progression Ratio
PPP	Parity Progression Probability
TFR	Total Fertility Rate
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
WLHA	Women living with HIV/AIDS
PLWHA	People living with HIV/AIDS
HAART	Highly Active Antiretroviral Therapy
UNAIDS	United Nations Programme on HIV and AIDS
NAIIS	National HIV/AIDS Indicator and Impact Survey
UNICEF	United Nations International Children's Emergency Fund
PRB	Population Reference Bureau
DHS	Demographic and Health Survey
NDHS	Nigeria Demographic and Health Survey
USAID	United States Agency for International Development

ABSTRACT

Childbearing remains a major concern for women living with HIV/AIDS (WLHA) worldwide because of the risk of HIV transmission not only to their uninfected partner but to their children as well, which results to childhood and maternal mortality. Understanding parity progression and patterns of birth spacing will play a vital role in reducing child mortality and adverse maternal outcome among women living with HIV. This study therefore investigated parity progression and birth spacing among women living with HIV in Nigeria.

This study utilized data set from a cross-sectional study on childbearing progression among 933 women living with HIV (age 15years and above) and receiving care at University College Hospital, Ibadan, Nigeria. Brass P/F ratio method, Cox regression model, Chi-square test and Parity progression ratio method were employed for the analysis.

Most women (92.8%) were educated and the common educational level was secondary education (47%). The average age of the women was 38.1 (± SD = 6.1) and most of the women had their first sex at mean age of 20.4 (± SD = 3.7) with 24.3 (± SD = 4.6) as their age at first birth. The study revealed that 35% of the women have had at least 4 children while others have had at most 3 children as at the time of the study.

Most (64%) had birth interval of 36 months and above, about 13% had a birth interval of less than 24 months, and 23% had a birth interval of 24-35 months. The median birth interval was 42 months. Parity progression ratio method revealed that probability of childbearing progression was significantly higher among women who have reached their end of childbearing age (45 – 49 years). Brass P/F ratio method exposed total fertility rate of 4.3 children per woman. Cox-proportional hazard multivariate model revealed that age group 30-34 years *(HR = 0.17*, 95%CI: 0.07-0.38)*, 35-39 years *(HR = 0.09*, 95%CI: 0.04-0.25)*, 40-44 years *(HR = 0.06*,*

95%CI: 0.02-0.19), 45-49 years*(HR = 0.09*, 95%CI: 0.03-0.34*), age at first birth *(HR = 0.21*,95%CI: 0.07-0.62),* educational level (secondary) *(HR = 4.45*, 95%CI: 3.41-4.50*), child death *(HR = 0.25*, 95%CI: 0.09-0.68)* and age at first intercourse *(HR = 2.26*, 95%CI: 1.04-4.91)* were significantly associated with childbearing progression from first birth to second birth, to third birth, to fourth birth and to fifth birth among women living with HIV. Also, chi-square test revealed significant association exist between age group of women, religious affiliation, age at first birth, ethnicity, partner's age, child death and birth interval at $p < 0.05$.

Based on this result, child spacing can be said to be improving among women living with HIV in Ibadan, as majority had birth interval of at least 36 months. Health intervention programmes on the need for limiting birth should be improved and made accessible to women living with HIV. This may lower fertility and reduce rate at which women living with HIV progress childbearing in Ibadan, Nigeria.

Key Words: Fertility, Parity Progression, Birth Interval, Women living with HIV

Word Count: 498

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Childbearing remains a major concern for women living with HIV/AIDS (WLHA) worldwide, because of the risk of HIV transmission not only to their uninfected partner but to their children as well. Sub-Saharan Africa, one of the regions with the highest population in the world bears the greatest burden of HIV/AIDS pandemic. Evidence synthesized by Zaba & Gregson (2002) from six African studies conducted in Tanzania, Uganda and Zambia have explored the effect of HIV/AIDS on human fertility desires and showed that HIV/AIDS reduced women's fertility by about 25-40% in the early period of the pandemic. Zaba & Gregson (2002) attributed this effect to biological factors (coital frequency causing low fecundability, sexually transmitted infections, foetal loss among HIV positive women) and behavioural factors (sexual behaviour of women due to the awareness of their HIV status, contraceptive behaviour, breastfeeding, and post-partum abstinence).

Women are mostly affected as they constitute more than half of the 37.9 million people living with HIV globally and approximately 76% of all HIV positive women live in sub-Saharan Africa (Global; UNAIDS, 2019). Despite the HIV status of the women, several studies conducted shows there is fertility desires among the women living with HIV both before and after the widespread availability of antiretroviral therapy (ART).

Before the widespread availability of antiretroviral therapy (ART) in sub-Saharan Africa, the fertility of HIV-positive women was lower than that of HIV-negative women, as childbearing by HIV infected persons were sometimes opposed by many women, men, and health care providers. This is because of ethical concerns about vertical transmission and maternal health. Research

also shows that HIV diagnosis is linked with lower fertility by about 25-40% among HIV positive women due to limited access to antiretroviral therapy in Africa (Kaida *et al*., Taulo *et al*., 2009; Angotti *et al*., 2009)

With the widespread availability of antiretroviral therapy (ART) and its expanding access both in the developed and developing world, antiretroviral therapy (ART) has transformed HIV/AIDS to a manageable chronic illness for many. Researchers (Sharma, Mittal, & Aggarwal, 2009) showed that there is a positive impact of antiretroviral therapy both on fertility and reproductive plans as women living with HIV/AIDS progress from one parity (number of children) to the next parity. Sharma, Mittal, & Aggarwal (2009) examined that after the availability of highly active antiretroviral therapy (HAART), rate of childbearing was 150% higher among the HIV-infected women than in the pre-antiretroviral therapy era compared to 5% increase among HIV negative women in the same period. In the previous studies, other factors found to be linked with the desire for more children were not only the use of ART, but also younger age, marital relationship, male gender and higher CD4 count.

Recently, people living with HIV accessing antiretroviral therapy worldwide has risen from 7.7 million people in 2010 to 23.3 million in 2018 with 62% of adults and 54% of children living with HIV receiving lifelong antiretroviral therapy (ART). As access to ART improves and become widely available, several studies document a rebound increase in fertility desires of women living with HIV/AIDS (WLWHA) (UNAIDS, 2018).

According to UNAIDS (2018), 58% of the people living with HIV in Nigeria are women of childbearing age and 33% of all people living with HIV are accessing antiretroviral treatment. Nigeria ranks the second largest HIV epidemic in sub-Saharan Africa, with the national HIV

prevalence of 1.5% among adults aged 15–64 years, whereas women aged 15–49 years are more affected than men living with HIV (1.9% versus 0.9%) (NAIIS, 2018)

In spite of the high prevalence among women, childbearing still remains a source of concern for women living with HIV/AIDS (WLHA). According to United Nations (2018), Nigeria the most populous country in Africa has the total fertility rate of 5.3 which is relatively high compared with Asia and Latin America where the total fertility rate is 2.2. Studies showed that most men and women in their reproductive years commonly desire to haSve more children with the proportion ranging from 30% to 78% depending on the number of survivors among their children (Iliyasu *et al.* , 2009; Kipp *et al.* , 2011; Myer *et al.* , 2007; Oladapo *et al.* , 2005; Regassa and Fantahun, 2012)

Beyond fertility desires, the occurrence of pregnancy among HIV positive women on ART was investigated and it was discovered that within three years of ART treatment, the pregnant women increased at the rate of 28% in Uganda (Homsy *et al.* , 2009; Kaida *et al.* , 2013) Incidentally, some of the main factors (age less than 30 years and having no children) motivating fertility desires are the same factors influencing pregnancy events (Berhan and Berhan, 2013)

Studies indicate that one of the reasons people living with HIV/AIDS (PLWHA) reconsidered sexual relationships and childbearing is access to antiretroviral therapy (ART). Especially in Nigeria, where marriage and family are considered important, research indicates that WLWHA whose health has been restored by ART still express their desires to bear children even after learning their status (Smith & Mbakwem, 2007). Smith & Mbakwem (2007) study in Nigeria discovered that people living with HIV/AIDS are strongly influenced by culture and that marriage and parenthood are considered essential in their aspirations of life.

Although studies have been conducted on fertility desires among women living with HIV, childbearing progression of women living with HIV has been rarely described despite its implications on women's reproductive health and HIV treatment outcomes in Nigeria. Similarly, it is unclear whether HIV diagnosis and care/treatment has altered parity progression of Nigerian women in anyway.

1.2 Problem Statement

As ART treatment becomes more widely available with major efforts directed at expanding access to life-saving antiretroviral therapy (ART) in sub-Saharan Africa to improve life expectancy of HIV positive individuals, yet not all HIV infected individuals are covered, especially in Nigeria experiencing low ART coverage of 33% compared to other African countries like South Africa with 53% ART coverage and Uganda with 65% ART coverage (UNAIDS, 2018).

In Nigeria, majority of new HIV infections that occur in children were among children born to HIV positive mothers, who acquire HIV infection from their mothers as over a quarter (26.9%) of global cases of mother to child transmission (MTCT) happen in Nigeria (UNAIDS, 2018). This is one of the major causes of child mortality in Nigeria where under-five and infant mortality rates are 128 deaths per 1000 live births and 69 deaths per 1000 live births respectively (Organization, Unicef, & UNAIDS, 2018)

Research shows that women living with HIV who lost their children to HIV pandemic choose to replace their lost ones and desire more children to ensure their preferred number of survivors or gender is achieved (Sofolahan & Airhihenbuwa, 2012). Uses of ART, socio-demographic, economic and behavioral factors also contribute to increase in a woman's parity especially if the desired number of children has not been achieved (Caldwell, Orubuloye, & Caldwell, 1992).

Studies consistently reveal that high frequency of childbearing and short birth interval (time in months between two consecutive births) negatively affect maternal health (Aleni, Mbalinda, & Muhindo, 2020). This is critical particularly in Sub-Saharan Africa where maternal and child mortality is high and among the regions contributing to poor maternal and child health outcomes globally.

1.3 Justification of the Study

Provided that access to antiretroviral therapy improves quality of life and survival for HIV infected people, it is generally acceptable that HIV-positive women should continue childbearing (Kavanaugh *et al*., 2013). Many people living with HIV renewed their desire for children. This desire is aggravated by the strong societal and traditional values attached to parenthood in Nigeria.

Although, studies have explored the effect of parity progression on women and found that high birth frequency is associated with high risk of death among women of reproductive age (Division, 2000; DaVanzo *et al*., 2004). This societal expectation coupled with improved access to ART implies that HIV care and treatment providers need to understand the actual needs of PLWH with respect to sexual and reproductive health services.

While researchers have attributed HIV/AIDS as one of the direct causes of childhood and maternal mortality, the patterns of birth spacing and parity progression associated with pregnancy are yet to be adequately explored and must be investigated in Nigeria. Parity progression and birth interval analysis are therefore important in providing insights into patterns of birth spacing among women living with HIV.

This study is needed to understand parity progression/the proportion of women who progress from having a number of children to additional child and provide insights into patterns of birth spacing for monitoring the health of women receiving HIV care (ART) in University College Hospital, Ibadan, Nigeria, in order to serve as evidence-based planning for the health of women living with HIV and to improve the sexual and reproductive health of women living with HIV in the country.

1.4.0 Research Objectives

1.4.1 General Objective

To investigate parity progression and patterns of birth interval among women receiving HIV care in University College Hospital, Ibadan, Nigeria.

1.4.2 Specific Objectives

1. To estimate the level of fertility among women living with HIV
2. To describe parity progression among HIV positive women who have reached their end of childbearing.
3. To determine the patterns of birth interval among mothers receiving HIV care
4. To examine factors associated with parity progression among women receiving HIV care
5. To investigate parity progression before and after HIV diagnosis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Preamble

Childbearing is highly considered in demographic research because of its great importance in determining size, composition and growth of a population. Factors associated with childbearing among HIV infected women in both developed and developing countries have been researched by several studies (Bloom & Canning, 2009; Kaida *et al*., 2009; Roser & Ortiz-Ospina, 2018). This section discusses fertility levels and patterns at Global, Africa and Nigeria level; previous literature on parity progression or childbearing among HIV infected women and determinants of birth intervals.

2.1.1 Global level and pattern of fertility

Over the past decades, several demographic changes occurred in most countries of the world. One of the major changes was the increase in population as a result of changes in family structure, fertility, mortality, migration and urbanization. The world population grew rapidly from 2.5 billion in 1950 to 7.2 billion in 2013 and it was projected to increase to 10.9 billion by 2100 (Bongaarts & Sobotka, 2012)

Recently, research shows that the global fertility rate per woman over her lifetime is at 2.4 which has declined from more than 5 children per woman experienced over 50 years ago. However, the global total fertility rate has been declining for the past few decades but still remains high enough to generate continuous population growth (Vespa, Armstrong, & Medina, 2018). Some of the factors responsible for the decline in global fertility are women empowerment, status of children and economic and technological changes (Roser & Ortiz-Ospina, 2018)

The total fertility rates differ widely in various parts of the world today, the lowest TFR are in South Korea (1.1), Singapore (1.2), and Taiwan (1.2) while the highest TFR are Niger (7.2), Chad (6.4), and the Democratic Republic of the Congo (6.3). Sub-Saharan Africa countries continue to experience rapid growth of population and increase in fertility (PRB, 2018).

2.1.2 Pattern and Level of Fertility in Sub-Saharan Africa

Sub-Saharan Africa region has the second largest population in the world with rapid growth rate. Research projected Africa's population will more than double by year 2050 to 2.6 billion and account for 58 percent of the world population increase by year 2050 which is very high compared to United States population (328 million) projected to reach 390 million (PRB, 2018). The annual reports on fertility patterns and trends from the world fertility patterns demonstrate that childbearing varies across the world. In the early stages of the demographic transition, high fertility occurs as a result of high desired family size (Bongaarts & Casterline, 2013) Sub-Sahara African countries in the transitioning category, has experienced fertility decline. For instance, Kenya declined from 4.6 children per woman in 2003 to 3.9 in 2014 and Namibia declined from 4.6 in 2006 to 3.6 in 2013 (DHS, 2013). While in Nigeria, the fertility transition is stalling when compared to other SSA countries.

The total fertility rate of Sub Saharan Africa was projected by US census bureau to decrease from 6.5 to 5.2. Sub-Sahara Africa's total fertility rate has declined from 6.5 to 4.7 children per woman. Yet, the average fertility rate of 4.7 children per woman in sub-Sahara Africa region remains the highest worldwide compared to Europe with lowest fertility of 1.6 children per woman (Organization, Unicef, & UNAIDS, 2018). The overall high fertility rate differs to a large extent by region, ethnicity, mother's educational attainment, and religion, wealth and high socioeconomic status women having the fewest children.

2.1.3 Pattern and Level of Fertility in Nigeria

Nigeria's population has been increasing rapidly for more than five decades as a result of high fertility rate and increasing life expectancy (Feyisetan & Bankole, 2009). In the early 1960s and 1970s, fertility rate was estimated to be 6.6 and 7.0 children per woman. Total fertility rate of 6.6, 6.5, 7.0, 6.4 and 7.4 per woman were estimated for the years 1965, 1970, 1975, 1982 and 1986 respectively. The increase between 1965 and 1986 implies the stalling of high fertility levels. Researchers examined that reason for high fertility rates was due to increase in revenue generated from exports of fossil fuel which has effects on welfare and socioeconomic status of people, thereby encouraging high fertility (Feyisetan & Bankole, 2009). Subsequent to high fertility levels in the period between 1960s and 1980s, TFR declined slowly to 5.2 children per woman in the 1999 and increased again to 5.7 in 2003 and 2008 period.

Other factors attributed to rise in TFR are ethnicity, religious affiliations, low use of contraception, and education determining the ideal family size in Nigeria. This influences fertility decision making and women are more likely to socialize their children into having a large family. In the period between 1990 and 2013, TFR has declined from 6.3 to 5.5 (World Population Review, 2015).

Nigeria's urban population has grown at an average annual growth rate of more than 6.5 per cent over the past 50 years. This was not in proportion with the available social amenities and infrastructure as the population has risen substantially from 17.3 in 1967 to 49.4 per cent in 2017. According to World population review, fertility varies across different regions. In 2016, a pattern of lower rates in the south and higher rates in the north. Total fertility rate was lowest in the South West (4.4) and South South (4.3), followed closely by the South East (4.6). The North

Central shows a corresponding national rate of 5.3. The rates for the North West and North East are significantly higher at 7.3 and 6.4, respectively.

Today, Nigeria remains the most populous in Africa, the seventh globally with an estimated population of over 201 million (CIA, 2018). According to United Nation Population Fund (UNPF), Nigeria's population of 195.9million as at 2018 increased by approximately 5 million people to over 201 million people in 2019. Nigeria's total fertility rate has been declining since 2008 from 5.7 to 5.5 in 2013 and has recently declined to 5.3 in 2018. Despite the decline in fertility pattern, the fertility rate is still high compared to Asia and Latin America and the Caribbean with total fertility rate of 2.2 per woman (NDHS, 2018).

According to the United Nations, the population of Nigeria was projected to reach 411 million as the 3rd most populated country in the world by 2050. However, Nigeria's population increase has been attributed to factors like high value placed on having children, young age at marriage, low contraceptive use, low level of education, gender disparity in socio-economic status, unequal access to information and services, high levels of infant and child mortality, maternal mortality, high levels of poverty, prevalence of communicable diseases (including HIV/AIDS), emergence of non-communicable diseases as well as poor health and nutritional conditions among others (Ibisomi, 2017).

2.2 Fertility desires in the pre-ART era and post-ART era

Researchers shows that among women living with HIV in South Africa before wide availability of ART, childbearing desires were lower amongst HIV positive women than HIV negative women. Furthermore, studies reveal that partners, family or the community portrays stigmatized views and discourages fertility amongst HIV infected women (Peltzer, Matseke, Mzolo, & Majaja, 2009). However, other women decided to limit childbearing in response to their HIV

status at the time ART was not widely available. Factors such as negative attitudes of health workers discouraged some women living with HIV and struggle with the decision to have children despite advances in antiretroviral (ARV) therapy while strong desires for parenthood majorly influenced childbearing concerns in others

After the widespread availability of ART irrespective of individual ART use, studies revealed that strong negative association exist between HIV and fertility aspirations among the HIV patients in Uganda (Snow, Mutumba, Resnicow, & Mugyenyi, 2013). However, in high fertility settings of Nigeria, clinical health concerns is often superseded by individual aspirations or intervening social needs for a child (Smith & Mbakwem, 2007; Wekesa & Coast, 2014).

Studies in the U.S reported conflicting effects of ART on fertility rates. Early research in the U.S showed that there was an increase in pregnancy rates among HIV positive women since ART became available. In comparison of pregnancy rates amongst HIV infected women, it was discovered that there was 20% higher rates of pregnancy in the post-ART era (Blair, Hanson, Jones *et al.*, 2012)

Studies from Uganda showed that there was no association between desire and incidence of pregnancy. Homsy et al revealed that low pregnancy desires did not reflect the high incidence of pregnancy since the initiation on ART (Homsy *et al*., 2009; Makumbi *et al*., 2011). Makunbi et al also discovered that pregnancy rates was higher amongst women on ART when both partners reported a desire for children and lower rates when only the women reported a desire for more children.

Various researches carried out among HIV-positive women in Ethiopia have indicated different levels of fertility. Among HIV positive women, 15.7% had fertility desire in North Wollo, 44%

desired more children in Addis Ababa compared to 92% and 53% of women that desire fertility in Oromia region and Harari region of Ethiopia. Fertility desire was attributed to young age factor and HIV disclosure to a woman's sexual partner (Asfaw & Gashe, 2014; Getachew, Alemseged, Abera, & Deribew, 2010; Haile, Isahak, & Dessie, 2014)

Further reviews from other developing countries discovered that there were continued desires for childbearing among South Africa women on ART. Report concluded that younger women desire for childbearing in a relationship due to fewer biological children or no children (Eshetu & Mitsiwat, 2015; Kaida *et al*., 2006; Kipp *et al*., 2011; Wekesa & Coast, 2014).

In spite of wide accessibility to ART to improve individual health status, studies reveal that HIV still has negative impact on sexuality and reproduction among women living with HIV. Women infected with HIV face lots of challenges such as in partner relationships, sexual satisfaction and childbearing issues (Carlsson-Lalloo, Berg, Mellgren, & Rusner, 2018). Likewise, HIV infected women who desire to have a child experience stigmatization, shame and fear (Carlsson-Lalloo *et al*., 2018).

2.3 Childbearing among HIV infected Women

Parity progression is the proportion of women who progress from having a number of children to additional child. This will be used interchangeably for childbearing progression among HIV positive women in this study. In sub-Saharan Africa, it was observed that cultural perspectives to childbearing are more likely shaped by different individual concerns for future health, risk of transmission to future children and the welfare of living children.

Globally, people living with HIV were nearly 38 million in 2019 and women in sub-Saharan Africa constitute more than half of the people infected with HIV. According to UNAIDS, women of reproductive age constitute one of the largest groups infected with HIV/AIDS with 5,000 new

infections per day worldwide (UNAIDS, 2019). However, some infections result from vertical transmission especially among the children via mother to child transmission of HIV during pregnancy, childbirth or breastfeeding.

More than two decades, pregnancy has been discouraged among childbearing women living with HIV/AIDS (WLWHA) and that fertility was 25-40% lower among HIV infected women than their counterparts because of the risk of transmission not only to their partners but also to their children and their maternal health (Gregson, Zaba, & Hunter, 2002).

Sub-Saharan Africa, the most HIV affected region, with women as the most vulnerable population, has revealed that women of childbearing age constitute a larger proportion of 58% of the HIV infected individuals than men. Several studies have shown that HIV-infected individuals desire children less than non-infected individuals because of the risk of transmission (Delvaux *et al*., 2009; Kaida *et al*., 2011).

Today, Nigeria ranks the second largest HIV epidemic in sub-Saharan Africa. The national prevalence of HIV/AIDS among adults aged 15-64 years is 1.5% and women aged 15-49 years have the higher prevalence (1.9%) than men (0.9%) in the same age (NAIIS, 2018). According to UNAIDS, as HIV care and treatment becomes widely available and accessible, life expectancy, reproductive desires and sexual behavior of WLWHA improves. People living with HIV/AIDS (PLWHA) in Nigeria reconsidered childbearing. Recently, 62% of all people living with HIV were accessing antiretroviral treatment worldwide (Organization, Unicef, & UNAIDS, 2018).

In the past, it was discovered that HIV-infected women changed their intentions from desiring more children to not wanting more children over time and results to lower fertility intentions among many people living with HIV. Studies conducted in Malawi and Canada shows that the

proportions of HIV-positive women who wished to have children in the future were 17% and 69% (Dube *et al*., 2012; Loutfy *et al*., 2009).

With wide availability of ART in sub-Saharan Africa, the relationship between HIV and fertility changed gradually. It was discovered that fertility was higher in HIV positive women age less than 20 years due to selection into sexual activity. Conversely, some studies have revealed that HIV-infection affected women's and men's childbearing decisions. While many people living with HIV (PLHIV) report lower fertility intentions, researchers studied that being on antiretroviral therapy (ART) increase fertility desires (Kaida *et al*., 2009; Litwin *et al*., 2015; Maier *et al*., 2009; Myer *et al*., 2010)

Research shows that association between antiretroviral therapy (ART) and fertility desire is ambiguous. Some studies indicate that use of ART allows for women's increased fertility desire while others suggest that there is no association between the two and that decreased fertility desire is associated with factors like divorce or separation, as well as having at least one child. (Ashimi, Amole, Abubakar, & Ugwa, 2017; Berhan & Berhan, 2013; Kipp, Heys, Jhangri, Alibhai, & Rubaale, 2011; Mmbaga, Leyna, Ezekiel, & Kakoko, 2013)

In a study conducted among HIV positive people attending anti-retroviral clinic in a tertiary health facility in Sokoto, Nigeria, younger age, marital status and number of living children were identified as the key determining factors of fertility intentions. It was reported that respondents were largely influenced by demographic factors rather than health-related factors in making their reproductive decisions (Kaoje *et al*., 2015)

2.4 Factors influencing childbearing among women

Nigeria like other developing societies in sub-Saharan Africa has experienced high fertility levels in the last three decades (Akintunde, Lawal, & Simeon, 2013). Some factors associated with childbearing in Nigeria, such as age, education, ethnicity, age at first birth, religion, income, occupation, age at first marriage, age at first birth, marital status, survival status of the preceding child and age at first sex have been identified by some previous studies (Adebowale & Palamuleni, 2014).

2.4.1 Education

Fertility varies with mother's education and economic status.. A research conducted on spatial patterns and determinants of fertility in Nigeria identified secondary or higher level of education of the women as important factors contributing to the decline in fertility in Nigeria (Alaba *et al*. 2017). The existence of relationship between women's education and fertility has received much attention in literatures.

In a situation where educated women perceive childbearing as incompatible with attaining personal goals and ambitions, childbearing is likely to be delayed or postponed (Adebowale & Palamuleni, 2014). Very early in a transition, small increases in education can actually increase fertility rates in some contexts, but beyond primary school, education is generally associated with declining fertility rates. Education is also associated with higher consistency childbearing behavior for women who don't want to have children (Hoem *et al*. 2006; Kleven and Landais, 2017).

2.4.2 Marital Status

World Health Organization has indicated that divorced, separated, or widowed women were more likely to be HIV infected than single, married, or cohabitating women. In a study conducted among African women on the effect of changing marriage patterns on fertility, it was revealed that fertility levels are different by marital status, with lowest number of children among women outside a union compared to highest number of children ever born to married women (Magagula 2016). Researchers also discovered that married women who are living with their spouses had relatively more children than those who are divorced, widowed or single (Alaba *et al*. 2017). However, childbearing outside marital unions remain prevalent worldwide while the greatest proportions of childbearing takes place within marital unions.

2.4.3 Women's working status and fertility

Theories of demographic transitions consider female labour force participation as one of the causes for actual declines in fertility and fertility preferences. Many studies have found working women to experience lower fertility than their counterparts who are not working. For instance, working women, especially those engaged in non-domestic enterprises, have a conflict between work and reproduction. They find it more difficult to take care of their children than those women who are not working. Studies carried out in sub-Sahara Africa confirmed that empowerment influences the reproductive health outcomes such as contraceptive use, fertility, and birth spacing. Literature has shown that biological and behavioural determinants of fertility in Nigeria remain largely unchanged (Akintunde *et al.*, 2013) with low age at marriage, unemployment, low rate of contraceptive usage and high rate of exposure to sexual intercourse at relatively early age.

2.4.4 Ethnicity

Ethnicity refers to a group of people sharing similar culture, religion, language, beliefs or certain characteristics that distinguish them from their neighbouring communities. Studies reveal that early marriage and childbearing are more pronounced among Hausa/Fulani ethnic group than the Igbo and Yoruba (PRB, 2015).

2.4.5 Religion

Religion refers to system of beliefs, attitudes and practices among groups of individuals. For many religions, studies have reported that religiosity is directly related with an increase in the intention to have children. In the analysis of data from the Western phase of the national fertility and family survey in Nigeria, (Akintunde *et al*., 2013) discovered that fertility was highest among the traditionalists, followed by the Catholics, Protestants and Muslims. However, result was different in certain selected areas where it was discovered that average family size for women of all ages shows that Muslim fertility was found to be the lowest among the religious groups for Nigeria as well as in the North-east. But on the regional levels, Northwest and Southwest does not follow the national trend in the aspect of traditional religion whereby Catholics and Protestant leading in the Northeast and Southeast region in Nigeria. The findings of this literature are not consistent across sub-Saharan settings, with some studies showing higher fertility among Muslims than among Christians (Agadjanian & Yabiku, 2014).

2.4.6 History of child death

Infant and child mortality is an important factor which contributes to high fertility in Sub-Sahara Africa, particularly Nigeria. Previous studies in Kenya and Tanzania observed that an increase in child mortality causes fertility increase, while an increase in adult mortality or concerns about AIDS reduce fertility (United Nations, 2015). Research shows that while women are less likely

to have an unplanned pregnancy even after discussing pregnancy intentions with their health care providers, interpersonal and social factors such as gender expectations, family members and partners' preferences influence a woman's decisions to bear more children.

2.4.7 Age at First Birth

Age at first birth has been identified as one of the factors affecting high fertility level in developing countries of Asia and Africa where the practice of early marriage remain widespread (Guilbert, 2013; Haloi, 2014; Malhotra *et al*. 2011) unlike in many parts of Europe and North America where fertility has stabilized at low levels. The greatest proportions of childbearing occur within marital unions worldwide despite the fact that childbearing outside marital unions is at increased rate (Santhya *et al*., 2010).

An upward shift in age at marriage and changes in proportion married were identified by some studies as the important factors affecting fertility decline in some African countries (Bankole *et al*. 2008; Osufor 2011). Previous studies on age at marriage and its impact on fertility in Africa reported that increase in women's age at first union in some African nations had impact on the marginal reduction in fertility experienced in Africa in the last decades (Hertrich, 2017). NDHS (2013) reveals the median age at first birth for women was 20.2 years.

2.4.8 Age at first marriage

In many African societies especially among the educated and urban segments population, age at marriage keeps rising in family formation. NDHS (2013) showed that 61% of the women age 25-49 were married by age 20 and half of the women were married by age 18.

According to Nigeria Demographic Health Survey, the available records in Nigeria revealed that median age at first marriage in Nigeria were 17.1, 18.3, 17.2, 18.1 and 18.3 in 1990, 1999, 2003, 2008 and 2013 respectively, with North Western region having lowest age at first marriage of

15.4 in 2013 [NDHS 1990, 1999, 2003, 2013]. In a study of variation in age at first marriage among women in Nigeria, it was reported that South-west women ranked fourth among the six geopolitical zones whereby Oyo State women has the lowest chance of marrying at earlier age (20.3years) and giving birth early compared to other states in the South-West region in Nigeria (NDHS, 2013).

2.4.9 Age at first sexual intercourse

According to NDHS 2013, women and men in Nigeria tend to initiate sexual activity before marriage. Almost one-quarter of women age 25-49 have had sexual intercourse by age 15. The median age at first sexual intercourse for women and men age 25-49 were 17.6 years and 21.1 years respectively.

Nigeria Demographic Health Survey revealed women living in rural areas start sexual activity almost three years earlier than women living in urban areas (16.5 years and 19.2 years). Women with secondary education or higher education wait almost six years longer to initiate sexual activity than those with no education.

2.5 Birth Interval among women

Birth interval is defined as the period of time between two successive live births. Research has shown that information about birth intervals is very vital in understanding the health status of young children and childbearing women. Understanding the dynamics of birth spacing is of interest because inferences are constant with the view that in some developing countries, couples with large families have shorter birth intervals than those with smaller families (Adebowale & Palamuleni, 2014).

World Health Organization (WHO) defines short birth intervals as those less than 2 years which have implications on maternal and child health. World Health Organization has therefore

recommended birth interval of at least 24 months to reduce infant and child mortality and adverse maternal outcome. While other international organizations (USAID) have suggested longer birth spacing of at least 36 months to improve maternal and child health (Organization, 2007).

In sub-Saharan African settings, different birth intervals were observed in various countries and displayed at its optimal. According to Demographic and Health Survey (DHS), reports show that most of the African countries have a significant number of births occurring at short intervals. In Zimbabwe, short birth intervals were estimated at 11% and in Nigeria it was estimated at 23%. In East Africa, Tanzania and Kenya had almost similar birth intervals less than 24 months of 19% and 18% respectively.

Nigeria Demographic Health Survey shows that despite the increase of child spacing from at least 24 months to at least 36 months in order to reduce the risk of infant deaths in Nigeria, infants born less than two years after a previous birth still experience high under-five mortality rates (213 deaths compared with 103 deaths per 1,000 live births). NDHS 2013 revealed that median birth interval was 31.7 months.

2.6 Factors affecting Birth interval

A number of factors associated with birth intervals have been documented by researchers. Some of the factors are use of contraceptives, being sexually active, postpartum infecundability, abortion and sterility while indirect factors may include socio-cultural factors such as preference of a male child (Rai et al., 2014). Fayehun et al discovered that husbands' occupation, wealth index, living in rural or urban settings, types of contraceptives used and sex of preceding children determined birth intervals. (Fayehun, Omololu, & Isiugo-Abanihe, 2011).

Alaba, Olubusoye, & Olaomi (2017) have shown that short birth intervals (less than 24 months) are related with poor health outcomes, particularly during infancy. Children born too soon after a previous birth, especially if the interval between the births is less than two years, have high risk of contracting sickness and death at an early age. On the other hand, longer birth intervals (more than two years) contribute to improved health status for both mother and child.

2.7 Previous studies on Parity progression and Birth Interval among women

In a recent study conducted on birth interval and associated factors among women of reproductive age 15-49 years attending young child clinic at Yumbe Hospital in Uganda revealed that more than half of the women (52.4%) had short birth interval (<24 months) and 86.6% of the women desired an optimal birth intervals of 24 months and above. In the study, it was also discovered that factors associated with short birth intervals were young maternal age (15-24 years), no use of contraceptives, and lack of husband's involvement in child spacing activities. (Aleni, Mbalinda, & Muhindo, 2020).

Another study conducted on childbearing dynamics among married women of reproductive age in Nigeria has shown that about two-fifth of the women left between 24 - 35 months births interval. While the hazard rate of progressing to first birth after marriage was higher among women with higher education than those with lower education. The multivariate analysis further exposed that the hazard of childbearing progression was consistently higher among women who have lost their previous births than those who have not lost their previous births (Adebowale & Palamuleni, 2014).

There were very few studies on parity progression and birth spacing among women. However none, even if available, have been conducted among the women living with HIV in Nigeria.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study Area

The Antiretroviral Clinic in University College Hospital, Ibadan (an 850-bed first tertiary hospital) located in Nigeria, was one of 25 Antiretroviral Clinic (ARV) clinics established and funded by the Federal Government of Nigeria in 2002 to provide antiretroviral drugs to the initial 10,000 adults nationwide at a subsidized rate. Since 2004, the President Bush Emergency Plan for AIDS Relief (PEPFAR) has provided immense support for the scale-up of the nation's antiretroviral treatment programme, initially at the government subsidized rate of 1,000 Naira per month (US $7.0) but free since January, 2006. The clinic serves the entire southwestern part of Nigeria and beyond.

3.2 Study Population: The study focused on women age 15 years and above that consented to participate in the study.

3.2.1 Inclusion Criteria: Women who have children and have been enrolled for treatment and care for at least 12 months were considered eligible in the main study.

3.2.2 Exclusion Criteria: Women who refused consent or were too ill to respond to interview questions were excluded in the main study.

3.3 Study Design: The study was cross-sectional in design and used a data collected in a project on childbearing progression and proximate determinants of fertility among women living with HIV in Ibadan sponsored by Medical Education Partnership Initiative in Nigeria (MEPIN).

3.4 Sampling technique

A stratified random sampling technique with proportional allocation was employed in selection of study participants.

3.5 Sample Size

A sample size of 933 women of reproductive age (15years and above) receiving HIV care and treatments were interviewed in this study.

3.6 Data Collection: The approval to use data set was obtained from the originator of the project on childbearing progression and proximate determinants of fertility among women living with HIV in Ibadan.

3.7 Study Variables

3.7.1 Independent Variables

The independent variables are: age, education, religion, ethnicity, occupation, marital status, partner's education, partner's occupation. And these have been used by previous authors (Adebowale & Palamuleni, 2014).

3.7.2 Mediating Variables

The mediating variables are age at first birth, age at first sex, age at first marriage, number of marital unions, and history of child death.

In a study of childbearing dynamics among married women of reproductive age in Nigeria by (Adebowale & Palamuleni, 2014), age at first birth, age at first marriage, and number of marital unions were regarded as intermediate variables.

3.7.3 Outcome Variables

This study has two sets of dependent variables; Proportion of women progressing to next parity and Birth interval.

3.7.4 Description of explanatory and outcome variables

Current age

Age is the number of complete years lived since birth. Age was categorized in this study as 15-19=1, 20-24=2, 25-29=3, 30-34=4, 35-39=5, 40-44=6, 45-49=7. The data were restricted to women of childbearing age 15 and above receiving HIV care because this group of women is more vulnerable to childbearing activities.

Women level of education

This variable measures the level of education that a woman has completed and is categorized into 4 groups as no education, primary, secondary and higher. Dummies are created as follows.

No education = 0

Primary education = 1

Secondary education = 2

Higher education = 3

Religion The religious affiliation in this study is grouped into 2 categories:

Christianity = 1

Islam = 2

Ethnicity: Ethnicity was categorized in this study as:

Yoruba = 1

Igbo = 2

Hausa = 3

Others = 4

Women Type of Occupation This is categorized as:

Employed {Self employed, Working for someone else/family friend} = 1

Unemployed = 2

Age at first sexual intercourse: This is categorized as

$\leq$ 13 years = 1

$14 - 16$ years = 2

$17 - 19$ years = 3

$20 - 24$ years = 4

25+ years = 5

Age at first birth is categorized as

<18 years = 1

18-24 years = 2

25-29 years = 3

$\geq$ 30 years = 4

Age at first marriage is categorized as

$\leq$ 19 years = 1

20-24 years = 2

25-29 years = 3

$\geq$ 30 years = 4

History of child's death

If a baby dies shortly after birth, the mother is likely to reduce her planned birth interval so as to replace the lost child, thus increasing the size of her children ever born. This variable was categorized as Yes=1 and No=2

Births interval

It is defined as the time in months between two consecutive births. It is categorized as:

<24 months = 1

24-35 months = 2

36+ months = 3

Marital Status: This was categorized as;

Married/Living with a Man = 1

Widowed = 2

Divorced/ Separated = 3

Never married = 4

Number of marital unions

The number of marital union has consequences on number of children a woman bears including spacing and timing of such births. For instance, a woman who has not experienced her desired number of children in her previous marriage may have to bear more children in her new union. It was categorized as; Once = 1 More than once = 2

Partners Education

This variable measures the level of education that a woman's partner has completed and was categorized into 4 groups as no education, primary, secondary and higher.

None = 1

Primary education = 2

Secondary education = 3

Higher education = 4

Partners Occupation This variable measures a woman's partner occupational status and is categorized into 2 groups as Employed= 1 if working and Unemployed=2 if not working

3.8 Data analysis

Descriptive statistics of socio-economic and demographic characteristics and other categorical variables were presented using percentages while quantitative variables were summarized using, mean, median, standard deviations and interquantile range.

3.8.1 To address Objective one, Brass P/F ratio was used to estimate fertility levels.

This method entails the adjustment of the observed age specific fertility rates, which are assumed to represent the true age pattern of fertility, to be in consistent with the fertility level depicted by the average parities of women in age groups less than 30 – 35, which is assumed to be accurate. For a full exposition of the approach, methods described were originally presented in Manual X as extensions of the Brass *P/F* ratio method to obtain the adjusted Total Fertility Rate (TFR) (Moultrie et al., 2013).

3.8.2 Parity Progression Ratio method was used to achieve objective two,

Parity Progression ratios (PPR) measures the proportion of women in a given cohort and of a given parity that progress to the next parity. The socio-demographic characteristics like age group (45-49) will be applied to measure parity progression ratio among HIV positive women who have reached their end of childbearing age (Moultrie et al., 2013).

The following measures can be calculated specifically for any age group of women:

Observed parity progression ratios of order i for women aged x to $x + 5$ are denoted ${}_5a_x\,(i)$ to represent the proportion of women with at least i children who have progressed to have at least one more subsequent birth. Projected parity progression ratios are denoted by ${}_5a_x\,(i\,)$.

Parity progression ratios can be expressed as;

$$a(i) = \frac{W(i+1)}{W(i)} = \frac{W(i+1)/N}{W(i)/N} = \frac{M(i+1)}{M(i)}$$

Where N(i) is the number of women in the population of parity *i* exactly, and denote the total number of women in the population as *N*.

W(*i*) is the number of women in the population having attained parity *i* or higher, and denote the highest parity attained in the population by π.

M(i+1) is the proportion of women attaining parity *i* + 1 or higher can be expressed in terms of parity progression ratios a(*i*) for lower birth-order transitions:

$$M(i+1) = a(i).\ M(i) = a(i).\ a(i-1).\ M(i-2)$$

$$= a(i).\ a(i-1).\ A(i-2)\ldots..a(0)$$

$$= \prod_{j-1}^{i} a(j)$$

Where $\prod$ denotes cumulative multiplication

On the other hand, HIV positive women ages 45-49 years are considered to have reached the end of the reproductive period. This is because women in this age group are expected to have completed childbearing either as a result of being menopausal or sterilized or are satisfied with the number of children they already have.

3.8.3 To achieve Objective three, Chi-square test was employed.

Chi-square test was used to explore the association between birth intervals and independent variables in this study. If p value < 0.05, the association is said to be significant, and if otherwise it is said to be insignificant.

3.8.4 To achieve Objective four, Cox proportional hazards regression model was employed to examine the factors associated with parity progression.

Cox Regression model

In the multivariate analysis, the multiple Cox regression model was used to determine the factors associated with progression to next parity. Here, the hazard of progression to next parity becomes the dependent variable. The Cox regression model is based on the assumption of proportional hazard (i.e. the ratio of hazard function of two individuals with covariates does not change with respect to time).

Therefore if the proportional hazard is assumed we have;

$$h(t) \Big/ h_o(t) = \Psi$$

Where, Ψ is a constant > 0

$$h(t) = \Psi\, h_o(t)$$

$$\Psi = \exp\left(\sum_{j=1}^{P} b_j x_j\right) = \exp(b'x)$$

$$h(t) = \exp\left(\sum_{j=1}^{P} b_j x_j\right) h_o(t) = h_o(t)\exp(b'x)$$

The explanatory variables are; age, education, religion, ethnicity, occupation, marital status, age at first birth, age at first marriage, age at first intercourse, number of marital unions, history of child's death and other factors. The inclusion of these variables is as a result of their relationship with timing of birth as expressed under variable description above.

3.8.5 To achieve objective five, Parity Progression Ratio (PPR) method was employed.

Parity progression ratio method as explained above was be used for objective five to explain the difference in the parity progression among HIV positive women before HIV diagnosis and after HIV diagnosis.

3.9 Ethical Approval:

The approval to carry out this study was obtained by the originator of the project on childbearing progression and proximate determinants of fertility among women living with HIV in Ibadan.

CHAPTER FOUR

RESULTS

4.1 Background information of women living with HIV

The record of the 933 women included in the study revealed that; averagely, each of the women in the study was aged 38 years; approximately 30% were aged 35 – 39 years, more than a quarter were aged 40 – 44 years (27%) and approximately 17% were aged 45-49 years. Most common level of education among women was secondary school attainment (47%); one quarter of the women had a higher education (25%); others (27%) had either the primary education or non-formal education. The study revealed there were more women who were affiliated with the Christian faith (61%), than those affiliated with the Islam faith (39%).

Majority of the women were from the Yoruba ethnic group (80%); a few were Igbo (8%), the least represented were Hausa women (3%) and women from other minority groups (8%). Most of the women who reported their occupational status were found to have been employed (90%); they were self-employed, employed with other persons or employed with a family member while others (10%) were unemployed. More than three-quarter of the women enrolled on the study were married (77%); others were widowed (13%), divorced/separated from partners (9%), and never married (1%).

Averagely, the age at first marriage among the women was approximately 24 years; about 14% reported having their first marriage at an age below 20 years, most had their first marriage between 20 – 24 years (42%), almost one-third had their first marriage between 25 – 29 years (32%), while a few had their first marriage at an age of 30 years or later (12%). The study also revealed that, most of the women reported they had been married or cohabited with a man just

once (81%), a relatively fewer proportion of the women reported been married more than once or cohabited with a man more than once (18%).

On the average, the partner for each of the woman was aged 45 years; most of the partners were aged 35 – 44 years (43%) and a second major portion were aged 45 – 54 years (41%). More than one-third of the partners had attained a higher education (37%), nearly half of the partners had just the secondary education (48%), and others had a primary or non-formal education (15%). More than three-quarter of the partner were employed (85%) at the time of the study and just a few were unemployed (15%). About one-third of the partners were reported to have other wives (34%).

Table 4.1: Background information of women living with HIV

	Frequency (n = 933)	Percentage
Age group [38.1 ± 6.1]		
≤ 29 years	75	8.0
30 – 34 years	173	18.5
35 – 39 years	277	29.7
40 – 44 years	252	27.0
45 – 49 years	156	16.7
Level of education		
None	63	6.7
Primary	195	20.9
Secondary	443	47.5
Higher	232	24.9
Religion		
Christianity	567	60.8
Islam	366	39.2
Ethnicity		
Yoruba	751	80.4
Igbo	77	8.3
Hausa	28	3.0
Others	77	8.3
Occupational status (n = 932)		
Employed (Self-employed/working with others/family friend)	843	90.4
Unemployed	89	9.6
Marital status		
Married	721	77.3
Widowed	122	13.0
Divorced/separated	81	8.7
Never married	9	1.0
Age at first marriage[n = 924; 23.8 ± 4.4]		
≤ 19 years	126	13.6
20 – 24 years	392	42.4
25 – 29 years	296	32.0
≥ 30 years	110	12.0

Table 4.1 contd: Background information of women living with HIV

	Frequency (n = 933)	Percentage
Number of times married/cohabited with a man (n = 924)		
Once	753	81.5
More than once	171	18.5
Age of current partner[n = 810: 44.6 ± 7.4]		
≤ 34 years	55	6.8
35 – 44 years	349	43.1
45 – 54 years	330	40.7
≥ 55 years	76	9.4
Partner's level of education (n = 918)		
None	38	4.1
Primary	99	10.8
Secondary	444	48.4
Higher	337	36.7
Partner's occupational status (n = 915)		
Employed (Self-employed/working with others)	776	84.8
Unemployed	139	15.2
Partner has other wives (n = 908)		
Yes	312	34.4
No	596	65.6

4.1.1 Reproductive information of women living with HIV

Table 4.1.1 revealed some of the reproductive information of the study participants. A few of the study participants had just one child at time of the study (15%); less than, but nearly a quarter had two children (23%); more than a quarter had three children (27%), others have had at least four children (35%).

More than half of the women confirmed they desired for more children (54%), a few reported they were indecisive (4%). Averagely, the ideal number of children among the women was about 4 children per woman; majority reported their ideal number of children was 3 or 4 children (80%); about 14% reported they would ideally have 5 or more children; only a few reported to prefer not more than 2 children (6%).

The average age at first intercourse among the women was about 20 years; a few of the women reported they had their first intercourse not later than 13 years (2%); a few reported first intercourse at 14 – 16 years (9%); nearly one-third had their first intercourse between 17 – 19 years (32%); more than half reported their first intercourse was at an age of 20 years or later (57%).

The average age at first birth, among the study participants was about 24 years; about 5% reported having their first children before 18 years; nearly half had their first child between 18 – 24 years (48%); about one-third had their first child between 25 – 29 years (32%); a relatively fewer proportion had their first birth at age 30 or later (15%). The study revealed that, generally, more than three-quarter had childbirth prior their HIV diagnosis (79%); it was also revealed that, a relatively larger proportion had at least a child after HIV diagnosis (61%).

Table 4.1.1: Reproductive information of women living with HIV

	Frequency (n = 933)	Percentage
Children ever born		
One child	142	15.2
Two children	218	23.4
Three children	257	27.6
Four children	166	17.8
Five children	90	9.7
Six children	40	4.3
Seven or more children	20	2.1
Desire for more children		
Yes	500	53.6
No	399	42.8
Undecided	34	3.6
Ideal number of children [n = 912: 3.7 ± 0.9]		
$\leq$ 2 children	59	6.5
3 – 4 children	727	79.7
5+ children	126	13.8
Age at first intercourse [20.4 ± 3.7]		
$\leq$ 13 years	22	2.4
$14 - 16$ years	80	8.6
$17 - 19$ years	294	31.5
$20 - 24$ years	384	41.1
$25 +$ years	153	16.4
Age at first birth[$n = 928$: 24.3 ± 4.6]		
$<$ 18 years	46	5.0
18 – 24 years	449	48.3
25 – 29 years	297	32.0
$\geq$ 30 years	136	14.7
Had children before HIV diagnosis		
No	197	21.1
Yes	736	78.9
Had children after HIV diagnosis		
No	365	39.1
Yes	568	60.9

Figure 4.1.1: Birth interval among the women living with HIV

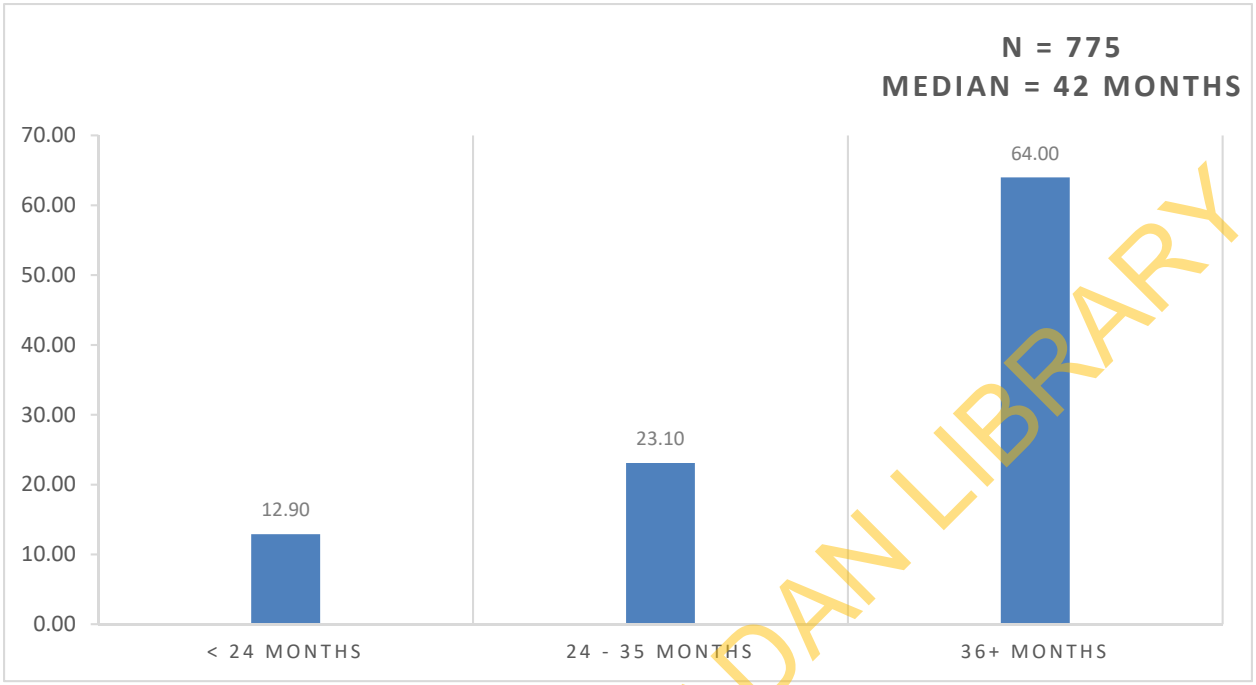

Figure 4.1.1: Birth interval among the women living with HIV

The study revealed the interval of births for the women (Figure 4.1.1). It was obtained that the median estimate was 42 months.

About 13% had an interval of less than 24 months between two successive births; about a quarter averaged an interval of 24 – 35 months between two successive births (23%) and most of the women had averaged a birth interval of 36 months and above (64%).

4.1.2 Information on HIV diagnosis of the women

The record on childbirth among the women showed that; averagely, each of the women had 2 children as at their time of diagnosis; a few had no child as at their time of diagnosis (18%); half of the women had 1 – 2 children as at period of diagnosis (50%); more than a quarter had had 3 – 4 children when they were diagnosed of HIV (27%); 5% reported they have had 5 – 6 children as at the period they were diagnosed to have had HIV.

A quarter (25%) of the women reported they had been diagnosed of HIV for 9 years or more; 31% reported been diagnosed for 6 – 8 years prior the study; 31% had been diagnosed 3 – 5 years previously; only a few (13%) were diagnosed in no more than 2 years to the study. As at period of the study, nearly all the HIV diagnosed women reported they had started using the ART (99%). Record among those (906 women) who could recall when they started ART revealed that; 18% had been on ART for not more than 2 years; more than one-third (37%) had been on ART for 3 – 5 years; more than a quarter (28%) had been on ART for 6 – 8 years; others reported they had used ART for at least 9 years (17%).

The study exposed that 13% of the women stated they had not disclosed their HIV status to the public; about 21% reported they had not disclosed their HIV status to their partners. It was also revealed in the study that; more than a quarter of the women (28%) confirmed their partners have been diagnosed to be positive to HIV; about half confirmed their partners were negative to HIV; while others reported they were unaware of their partners' status (24%).

Table 4.1.2: Information on HIV diagnosis of the women

	Frequency (n = 933)	Percentage
Number of children at diagnosis [1.9 ± 1.4]		
None	156	17.7
One	254	28.8
Two	190	21.5
Three	161	18.3
Four	80	9.1
Five	28	3.2
Six	13	1.5
Duration since tested positive to HIV		
≤ 2 years	122	13.0
3 – 5 years	290	31.0
6 – 8 years	289	31.0
≥ 9 years	232	25.0
Started ART (n = 932)		
Yes	919	98.6
No	13	1.4
Duration since use of ART (n = 906)		
≤ 2 years	167	18.4
3 – 5 years	333	36.8
6 – 8 years	250	27.6
≥ 9 years	156	17.2
Status disclosure (n = 932)		
Yes	809	86.8
No	123	13.2
Partner disclosure (n = 919)		
Yes	727	79.1
No	192	20.9
HIV status of partner		
Positive	257	27.6
Negative	448	48.0
Unknown	228	24.4

4.2: Level of fertility among women living with HIV

The level of fertility among the women, presented on Table 4.2, revealed that; from the 933 women, a total birth of 2,848 had been recorded; within the past 12-months to the survey, a total of 420 births were recorded among the women. Using the Brass P/F ratio estimate, the total fertility rate measure was 4.3; approximately, an expectation of 4 children per woman.

Table 4.2: Estimation of the Total Fertility Rate (TFR)

	No. of Women	CEB	12-month Births	Average parity per woman (P_i)	Period fertility rate (f_i)	Cumulative fertility (Θ_i)	Estimated parity equivalent (F_i)	P/F ratio	Fertility rate ($f^+{}_i$)	Adjusted fertility rate ($kf^+{}_i$)
15 – 19 years	2	2	2	1.000	1.000	5.000	2.448	0.409	1.102	0.220
20 – 24 years	14	21	10	1.500	0.714	8.571	6.935	0.216	0.706	0.141
25 – 29 years	59	144	61	2.441	1.034	13.741	11.886	0.205	1.015	0.203
30 – 34 years	173	448	102	2.590	0.590	16.689	15.434	0.168	0.586	0.117
35 – 39 years	277	848	196	3.061	0.708	20.227	19.058	0.161	0.670	0.134
40 – 44 years	252	817	44	3.242	0.175	21.100	20.819	0.156	0.150	0.030
45 – 49 years	156	568	5	3.641	0.032	21.260	21.221	0.172	0.024	0.005
TOTAL										**0.850**
TFR										**4.25**

NOTE: $K = 0.20$

Figure 4.3: Parity Progression among women who have reached their end of childbearing age 45-49 years

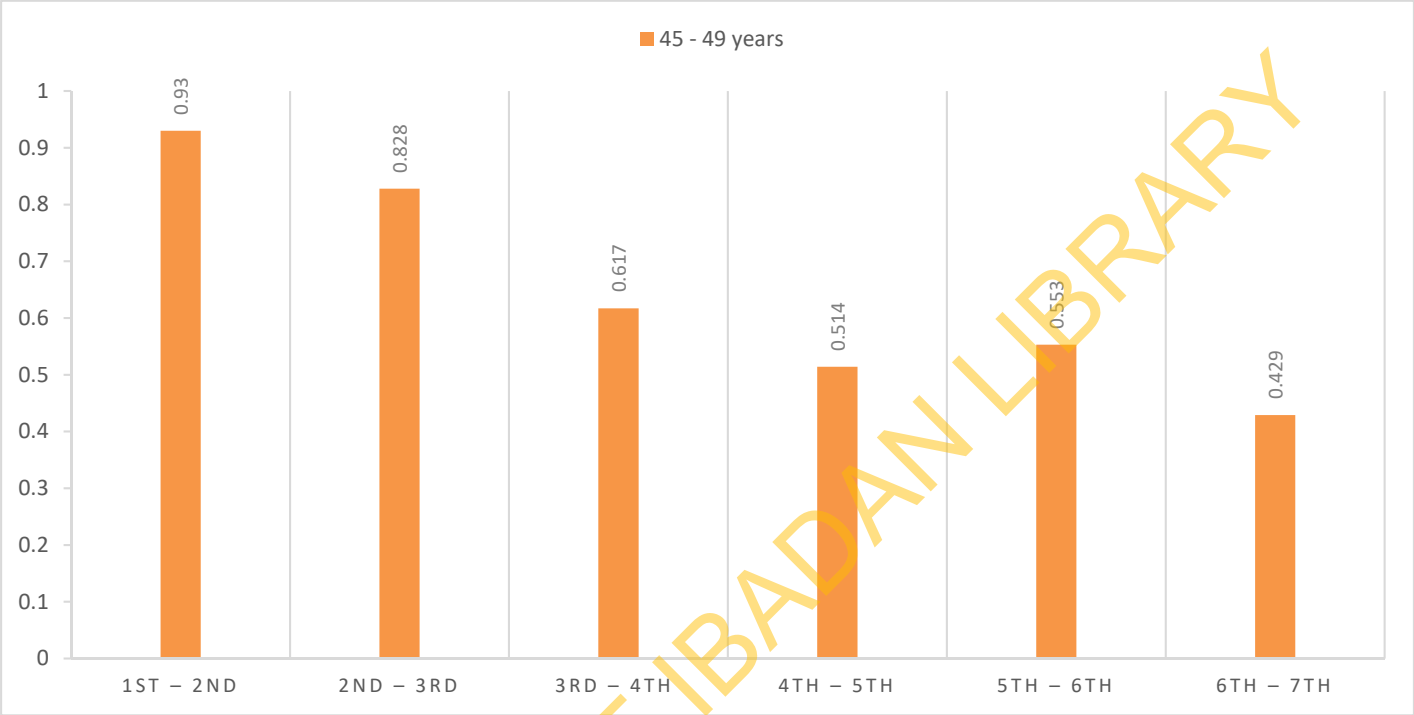

Figure 4.3: Parity progression among women who have reached their end of childbearing age 45-49 years

Figure 4.3 above reveals the pattern of parity progression among women in the end phase of their reproductive age 45 – 49 years.

Parity progression among women aged 45 – 49 years showed that; probability of progression from first birth to second birth was 93%; progression to third birth had a relative probability of 83%; parity progression to fourth birth was estimated to have a chance of 62%; relative probability of parity progression to fifth birth was 51%; progression to sixth and seventh birth among these women, was observed to have a probabilistic measure of 55% and 43% respectively.

4.4 Patterns of Births Interval

The study revealed the pattern of births interval among the women, distributed by various background factors – women's socio-demographics, partner's socio-demographics, and women's reproductive information.

Result from the study showed that; age group of women ($p = 0.024$), religious affiliation of the women ($p = 0.005$), ethnicity ($p = 0.012$), age at first marriage ($p < 0.001$), age of women's partner ($p = 0.009$), age at first birth ($p < 0.001$) and history of child death ($p = 0.004$) were significantly associated with the births interval.

It was observed that; median birth interval was highest among women age 45-49 years (45 months, IQR = 26); and lowest among women below 30 years (33 months, IQR = 22.5); the median birth interval was higher among Islamic women (45 months, IQR = 29) than the Christian women (40 months, IQR = 25); the median birth interval was higher for Yoruba women (43 months, IQR = 28) than women from other ethnic groups altogether (38 months, IQR = 24); the median birth interval was highest among women who had their first marriage at the age of 20 – 24 years (45 months, IQR = 28) and lowest among those aged 30 years and above (34.5 months, IQR = 28); median birth interval was highest among those with partners aged 55 years or higher (49 months, IQR = 26) and lowest among women with partners below 35 years (37 months, IQR = 36).

The median birth interval was highest among women who had their first birth between the age of 18 – 24 years (45 months, IQR = 30) and lowest among those who had their first birth at the age 30 years or later (33 months, IQR = 23); median birth interval was also observed to be lower

among women who had history of child death (38 months, IQR = 25) than those who had no child death history (44 months, IQR = 30).

The result showed that, other factors had no significant association with birth interval, these include: level of education of the women, occupational status, marital status, age at first intercourse, number of times married or cohabited with a man, partner's level of education, partner's occupational status, partner has multiple wives, and ideal number of children.

Table 4.4.1: Patterns of Births Interval according to Socio-demographic Characteristics

	Total women	< 24	24 – 35	36+	Median B.I. (IQR)	p-value
Age group						
≤ 29 years	44	25.0	27.3	47.7	33 (25, 47.5)	0.024
30 – 34 years	135	15.6	25.2	59.2	40 (29, 55)	
35 – 39 years	237	11.4	25.7	62.9	41 (30, 58)	
40 – 44 years	217	14.3	20.7	65.0	42 (30, 61)	
45 – 49 years	142	7.0	19.0	74.0	45 (34, 60)	
Level of education						
None	57	12.3	22.8	64.9	44 (31, 66)	0.376
Primary	174	8.1	21.8	70.1	42 (34, 54)	
Secondary	360	15.3	23.6	61.1	41.5 (30, 58)	
Higher	184	13.0	23.4	63.6	42 (29, 58)	
Religion						
Christianity	461	15.6	24.5	59.9	40 (29, 56)	0.005
Islam	314	8.9	21.0	70.0	45 (33, 62)	
Ethnicity						
Yoruba	625	11.2	23.0	65.8	43 (31, 59)	0.012
Others (Non-Yoruba)	150	20.0	23.3	56.7	38 (28, 52)	
Occupational status						
Employed	701	12.4	22.5	65.1	42 (31, 58)	0.136
Unemployed	73	17.8	28.8	53.4	36 (28, 52)	
Marital status						
Married	602	12.8	21.8	65.4	42 (30, 59)	0.224
Unmarried	173	13.3	27.8	58.9	40 (30, 54)	
Age at first marriage						
≤ 19 years	118	11.0	25.4	63.6	41.5 (31, 55)	< 0.001
20 – 24 years	340	7.9	20.0	72.1	45 (34, 62)	
25 – 29 years	241	16.6	26.1	57.3	38 (28, 53)	
≥ 30 years	74	27.0	24.3	48.7	34.5 (24, 66)	
Number of times married/cohabited with a man						
Once	624	13.6	23.9	62.5	40 (30, 56)	0.234
More than once	149	10.1	20.1	69.8	45 (31, 66)	

B.I – Birth Interval; IQR – Interquantile Range; Significant at p < 0.05

Table 4.4.2: Patterns of Births interval according to Marital and Fertility Profile

	Total women	< 24	24 – 35	36+	Median B.I (IQR)	p-value
Age of current partner						
≤ 34 years	34	29.4	17.7	52.9	37 (24, 60)	0.009
35 – 44 years	290	13.8	22.8	63.4	41 (30, 59)	
45 – 54 years	286	12.2	25.2	62.6	41 (30, 55)	
≥ 55 years	67	6.0	13.4	80.6	49 (38, 64)	
Partner's level of education						
None	31	9.7	22.6	67.7	47 (34, 66)	0.827
Primary	90	12.2	20.0	67.8	42.5 (32, 60)	
Secondary	387	12.9	22.0	65.1	41 (31, 56)	
Higher	260	113.5	26.1	60.4	42 (30, 60)	
Partner's occupational status						
Employed	647	11.9	22.0	66.2	43 (31, 60)	0.155
Unemployed	111	14.4	28.8	56.8	38 (29, 49)	
Partner has other wives (n = 908)						
Yes	265	12.8	20.8	66.4	42 (32, 58)	0.478
No	498	13.1	24.5	62.4	42 (30, 56)	
Ideal number of children						
≤ 2 children	41	19.5	19.5	61.0	42 (31, 61)	0.639
3 – 4 children	597	13.1	22.8	64.1	42 (30, 59)	
5+ children	118	11.0	26.3	62.7	40 (30, 52)	
Age at first intercourse						
≤ 13 years	21	14.3	9.5	76.2	47 (36, 52)	0.094
14 – 16 years	73	11.0	21.9	67.1	43 (31, 56)	
17 – 19 years	240	11.7	20.0	68.3	45 (31, 62)	
20 – 24 years	323	11.8	24.5	63.7	42 (30, 58)	
25 + years	118	19.5	28.8	51.7	36 (27, 52)	
Age at first birth						
≤ 17 years	44	11.4	22.7	65.9	41.5 (31, 57.5)	< 0.001
18 – 24 years	390	8.7	21.5	69.8	45 (32, 62)	
25 – 29 years	248	16.5	21.8	61.7	40 (30, 56)	
≥ 30 years	90	22.2	33.3	44.5	33 (25, 48)	
History of child death						
No	502	10.4	21.9	67.7	44 (32, 62)	0.004
Yes	273	17.6	25.2	57.1	38 (28, 53)	

B.I – Birth Interval; IQR – Interquantile Range; Significant at p < 0.05

4.5 Factors associated with Parity progression

Table 4.5 presents the hazard rate of progression from first birth to second birth, third birth, fourth birth and fifth birth. Women aged 30 – 34 years (*HR = 0.17*, 95%CI: 0.07-0.38*) 35 – 39 years (*HR = 0.09**, *95%CI: 0.04-0.25*) 40 – 44 years (*HR = 0.06**, *95%CI: 0.02-0.19*) and 45 – 49 years *(HR = 0.09**, *95%CI: 0.03-0.34*) were 17%, 9%, 6% and 9% less likely to progress to the second birth than those below 30 years. At higher order births, from 2nd to 3rd birth and 3rd to 4th birth, the hazard was consistently lower for women aged 30 – 34 years, 35 – 39 years, 40 – 44 years and 45 – 49 years. From 4th birth to 5th birth, the hazard of progressing for women aged 30 – 34 years (*HR = 0.02**, *95%CI: 0.01-0.09*) and 35 – 39 years (*HR = 0.02*, 95%CI: 0.04-0.08*) 40– 44 years (*HR = 0.01*, 95%CI: 0.00-0.03*) years and 45 – 49 years were 2%, 2%, 1%, 1% less likely to progress to the fifth birth than those below 30 years.

In comparison with women with no formal education, the hazard rate of progressing to 2nd birth after 1st birth was lower among women with primary education, secondary education and higher education. At higher order births, women with primary education, secondary education and higher education progressed from 2nd birth to 3rd birth and to 4th birth at higher hazard rate than those with no formal education. While the hazard of progressing from 4th birth to 5th birth was significantly higher among women with primary education *(HR = 3.40*, 95%CI: 3.32-3.54)*, secondary education (*HR = 4.45*, 95%CI: 3.41-4.50*) and higher education (*HR = 4.38* 95%CI: 4.32-5.56)* than those with no formal education.

Women who currently desired for more children significantly progressed from 1st birth to 2nd birth at higher hazard rate *(HR = 12.12*, 95%CI: 4.98-29.5)* than those who reported not to desire for more children. From 2nd to 3rd birth, 3rd to 4th birth *(HR = 1.88*, 95%CI: 1.27-2.79)* and 4th

birth to 5th birth, women were 189%, 88% and 46% more likely to progress childbearing than those who reported not to desire for more children.

Women who confirmed they had ever breastfed their index child were 90% less likely to progress to 2nd birth after 1st birth; the rate was consistently higher from 2nd birth to 3rd, 4th and 5th birth *(HR = 3.80*, 95%CI: 2.02-7.14)* than others who confirmed not to have breastfed their index child.

The table showed that the hazard of progressing to second birth and fourth birth was consistently lower for women with older partners aged 35 – 44 years, 45– 54 years and 55 years-old partners and above, than women with partners' age below 35 years. Childbearing progression to 5th birth after 4th birth showed that the hazard of progressing was significantly lower among women with older partners aged 35 – 44 years *(HR = 0.06*, 95%CI: 0.01-0.36)* 45 – 54 years *(HR = 0.11*, 95%CI: 0.02-0.63)* and those with 55 years-old and above partners *(HR = 0.07*, 95%CI: 0.01-0.48)* than women with partner's age below 35 years. Women married to older partner were 6%, 11% and 7% less likely to progress to the fifth birth than women with partner's age below 35 years.

The hazard of progressing from 1st birth to 2nd birth and 3rd birth was consistently higher among women who had partners with primary education, secondary education and higher education than those who had partners with no formal education. Also, the hazard rate was consistently lower from 3rd to higher order births as women who had partners with primary education *(HR = 0.12*, 95%CI: 0.04-0.36)* secondary education *(HR = 0.30*, 95%CI: 0.11-0.80)*, higher education *(HR = 0.28*, 95%CI: 0.10-0.81)* were 12%, 30% and 28% less likely to progress to fourth birth than those who had partners with no formal education.

Women who reported they ideally wanted 3 – 4 children and 5 or more children progressed at lower hazard rate to 2nd birth, 3rd birth, 4th birth and 5th birth. Women who ideally wanted 3 – 4 children *(HR = 0.37*, 95%CI: 0.17-0.78)* were 37% less likely to progress to second birth after the first birth and those who ideally wanted 5 or more children *(HR = 0.27*, 95%CI: 0.07-1.0)* were 27% less likely to progress to second birth and *(HR = 0.23*, 95%CI: 0.08-0.67)* 23% less likely to progress to third birth compared to those who ideally wanted at most 2 children.

Compare with women who had their first intercourse at 25 years or later; the hazard of progressing was consistently lower from 1st to 2nd birth to 3rd birth but significantly higher from 4th to 5th birth among women who had their first intercourse at age 14 – 16 years *(HR = 9.40*, 95%CI: 2.40-36.01)* and age 20 – 24 years *(HR = 2.26*, 95%CI: 1.04-4.91)* which shows that women who had their first intercourse at age 14 – 16 years and 20 – 24 years are more likely to progress to the fifth child.

The table further exposed the hazard of progressing from 1st birth to 2nd birth, 3rd birth, 4th birth and 5th birth was consistently lower among women who had their first birth at age 18 – 24 years, 25 – 29 years, and 30 years and above than those who had their first birth below age 18 years. This implies that women who had their first birth at age 18 – 24 years *(HR = 0.21*, 95%CI: 0.07-0.62)*, 25 – 29 years *(HR = 0.17*, 95%CI: 0.05-0.57)* and 30 years and above *(HR = 0.12*, 95%CI: 0.03-0.44)* were 21%, 17% and 12% less likely to progress to the 3rd birth after 2nd second birth.

Also, the hazard rate of progressing from 1st birth to 2nd birth was low but later increased from 2nd birth to 3rd to 4th to 5th birth *(HR = 6.47*, 95%CI: 2.39-17.54)* among women who had disclosed their status to the public. This explained that women who had disclosed their status to

the public were more likely to progress to the fifth birth than those who had not disclosed their status to the public.

The hazard rate of progressing from 1st birth to 2nd birth *(HR = 0.25*, 95%CI: 0.09-0.68)*, 3rd, 4th and 5th birth was consistently lower among women who had no history of child death than their counterparts. This implies that those who reported to have experienced child death are more likely to progress childbearing than those that did not experience child death.

Table 4.5: Factors associated with Parity progression: Cox Proportional Hazard Regression

	1st – 2nd HR	95% CI	2nd – 3rd HR	95% C.I
Age group				
≤ 29 years (Ref. Cat.)	1		1	
30 – 34 years	0.17*	(.07 - .38)	0.79	(.28 - 2.22)
35 – 39 years	0.09*	(.04 - .25)	0.51	(.18 - 1.40)
40 – 44 years	0.06*	(.02 - .19)	0.36	(.12 - 1.05)
45 – 49 years	0.09*	(.03 - .34)	0.46	(.14 - 1.50)
Level of education				
None (Ref. Cat.)	1		1	
Primary	0.95	(.20 - 4.54)	0.75	(.23 - 2.42)
Secondary	0.83	(.19 - 3.65)	1.10	(.35 - 3.40)
Higher	0.89	(.19 – 3.98)	1.52	(.47 - 4.97)
Religion				
Christianity (Ref. Cat.)	1		1	
Islam	0.81	(.48 - 1.35)	0.77	(.51 - 1.14)
Ethnicity				
Others (Non-Yoruba) (Ref. Cat.)	1		1	
Yoruba	1.33	(.68 - 2.60)	1.14	(.67 - 1.99)
Occupational status				
Unemployed (Ref. Cat.)	1		1	
Employed	0.91	(.41 - 2.03)	0.90	(.41 - 1.95)
Marital status				
Unmarried (Ref. Cat.)	1		1	
Married	0.49	(.23 - .99)*	0.67	(.36 - 1.25)
Age at first marriage				
≥ 30 years (Ref. Cat.)	1		1	
25 – 29 years	0.93	(.47 - 1.86)	1.15	(.64 - 2.06)
20 – 24 years	0.84	(.32 - 2.21)	0.90	(.44 - 1.86)
≤ 19 years	0.36	(.08 - 1.64)	1.16	(.45 - 3.05)
Desire for more children				
No (Ref. Cat.)	1		1	
Yes	12.12*	(4.98 -29.5)	2.89*	(1.87 - 4.46)
Ever breastfed (index child)				
No (Ref. Cat.)	1		1	
Yes	0.90	(.54 - 1.50)	1.34	(.89 - 2.03)
Married/cohabited with a man				
Once (Ref. Cat.)	1		1	
More than once	0.78	(.40 - 1.53)	0.88	(.53 - 1.46)
Partner has multiple wives				
No (Ref. Cat.)	1		1	
Yes	1.08	(.63 - 1.84)	0.93	(.61 - 1.42)

***Significant at p < 0.05; HR- Hazard Ratio, Ref Cat: Reference Category**

Table 4.5 contd: Factors associated with Parity progression: Cox Proportional Hazard Regression

	3rd – 4th HR	95% CI	4th – 5th HR	95% CI
Age group				
≤ 29 years (Ref. Cat.)	1		1	
30 – 34 years	0.70	(.25 - 1.96)	0.02*	(.01 - .09)
35 – 39 years	0.55	(.21 - 1.46)	0.02*	(.04 - .08)
40 – 44 years	0.25*	(.09 - .70)	0.01*	(.00 - .03)
45 – 49 years	0.26*	(.09 - .79)	0.01*	(.00 - .03)
Level of education				
None (Ref. Cat.)	1		1	
Primary	1.73	(.58 - 5.18)	3.40*	(3.32 - 3.54)
Secondary	1.66	(.57 - 4.86)	4.45*	(3.41 - 4.50)
Higher	1.58	(.50 - 4.98)	4.38*	(4.32 - 5.56)
Religion				
Christianity (Ref. Cat.)	1		1	
Islam	0.63*	(.42 - .93)	0.93	(.55 - 1.57)
Ethnicity				
Others (Non-Yoruba) (Ref. Cat.)	1		1	
Yoruba	0.89	(.56 - 1.41)	0.98	(.46 - 2.10)
Occupational status				
Unemployed (Ref. Cat.)	1		1	
Employed	0.72	(.37 - 1.41)	0.99	(.24 - 4.05)
Marital status				
Unmarried (Ref. Cat.)	1		1	
Married	0.96	(.56 - 1.67)	0.39*	(.18 - .86)
Age at first marriage				
≥ 30 years (Ref. Cat.)	1		1	
25 – 29 years	1.67	(.82 - 3.41)	1.40	(.43 - 4.54)
20 – 24 years	1.28	(.57 - 2.88)	1.86	(.54 - 6.35)
≤ 19 years	1.26	(.44 - 3.64)	1.25	(.28 - 5.62)
Desire for more children				
No (Ref. Cat.)	1		1	
Yes	1.88*	(1.27 - 2.79)	1.46	(.81 - 2.65)
Ever breastfed (index child)				
No (Ref. Cat.)	1		1	
Yes	1.56*	(1.04 - 2.31)	3.80*	(2.02 - 7.14)
Married/cohabited with a man				
Once (Ref. Cat.)	1		1	
More than once	0.75	(.48 - 1.18)	0.49*	(.24 - .99)
Partner has multiple wives				
No (Ref. Cat.)	1		1	
Yes	1.32	(.90 - 1.95)	1.54	(.84 - 2.82)

***Significant at p < 0.05; HR- Hazard Ratio, Ref Cat: Reference Category**

Table 4.5 contd: Factors associated with Parity progression: Cox Proportional Hazard Regression

	1st – 2nd HR	95% CI	2nd – 3rd HR	95% CI
Age of current partner				
≤ 34 years (Ref. Cat.)	1		1	
35 – 44 years	0.71	(.35 - 1.44)	0.56	(.28 - 1.14)
45 – 54 years	0.86	(.36 - 2.04)	0.61	(.28 - 1.34)
≥ 55 years	0.89	(.29 - 2.77)	0.56	(.20 - 1.60)
Partner's level of education				
None (Ref. Cat.)	1		1	
Primary	1.18	(.16 - 8.71)	1.18	(.32 - 4.33)
Secondary	1.94	(.39 - 9.70)	1.49	(.45 - 5.01)
Higher	1.95	(.41 - 9.29)	1.15	(.35 - 3.79)
Partner's occupational status				
Unemployed (Ref. Cat.)	1		1	
Employed	0.86	(.34 - 2.15)	2.20	(.93 - 5.20)
Ideal number of children				
≤ 2 children (Ref. Cat.)	1		1	
3 – 4 children	0.37*	(.17 - .78)	0.58	(.29 - 1.14)
5+ children	0.27*	(.07 - 1.0)	0.23*	(.08 - .67)
Age at first intercourse				
25 + years (Ref. Cat.)	1		1	
20 – 24 years	0.81	(.43 - 1.54)	0.35	(.84 - 2.26)
17 – 19 years	1.32	(.66 - 2.64)	0.37	(.70 - 2.24)
14 – 16 years	0.29	(.06 - 1.21)	0.72	(.62 - 3.86)
≤ 13 years	1.21	(.12 - 12.06)	0.64	(.06 - 5.09)
Age at first birth				
≤ 17 years (Ref. Cat.)	1		1	
18 – 24 years	0.21	(.02 - 2.46)	0.21*	(.07 - .62)
25 – 29 years	0.11	(.01 - 1.42)	0.17*	(.05 - .57)
≥ 30 years	0.11	(.01 - 1.56)	0.12*	(.03 - .44)
History of child death				
Yes (Ref. Cat.)	1		1	
No	0.25*	(.09 - .68)	0.96	(.52 - 1.77)
Duration since diagnosis				
≤ 2 years (Ref. Cat.)	1		1	
3 – 4 years	0.99	(.47 - 2.06)	0.86	(.44 - 1.66)
5 – 6 years	1.36	(.63 - 2.95)	1.03	(.52 - 2.03)
7 – 8 years	0.76	(.31 - 1.85)	1.30	(.68 - 2.44)
9 – 10 years	0.78	(.32 - 1.86)	1.08	(.56 - 2.09)
> 10 years	1.33	(.54 - 3.28)	1.28	(.58 - 2.80)

***Significant at p < 0.05; HR- Hazard Ratio, Ref Cat: Reference Category**

Table 4.5 contd: Factors associated with Parity progression: Cox Proportional Hazard Regression

	3rd – 4th HR	95% CI	4th – 5th HR	95% CI
Age of current partner				
≤ 34 years (Ref. Cat.)	1		1	
35 – 44 years	1.02	(.31 - 3.35)	0.06*	(.01 - .36)
45 – 54 years	1.49	(.44 - 4.97)	0.11*	(.02 - .63)
≥ 55 years	0.91	(.23 - 3.67)	0.07*	(.01 - .48)
Partner's level of education				
None (Ref. Cat.)	1		1	
Primary	0.12*	(.04 - .36)	0.12*	(.02 - .94)
Secondary	0.30*	(.11 - .80)	0.24	(.03 - 1.79)
Higher	0.28*	(.10 - .81)	0.52	(.06 - 4.14)
Partner's occupational status				
Unemployed (Ref. Cat.)	1		1	
Employed	1.56	(.85 - 2.87)	2.64*	(1.11 - 6.27)
Ideal number of children				
≤ 2 children (Ref. Cat.)	1		1	
3 – 4 children	0.80	(.40 - 1.59)	1.12	(.34 - 3.64)
5+ children	0.41	(.17 - .97)*	0.43	(.11 - 1.62)
Age at first intercourse				
25 + years (Ref. Cat.)	1		1	
20 – 24 years	1.52	(.91 - 2.53)	2.26*	(1.04 - 4.91)
17 – 19 years	1.21	(.65 - 2.25)	0.96	(.40 - 2.33)
14 – 16 years	1.23	(.48 - 3.15)	9.40*	(2.4 - 36.01)
≤ 13 years	0.58	(.11 - 2.99)	0.36	(.05 - 2.63)
Age at first birth				
≤ 17 years (Ref. Cat.)	1		1	
18 – 24 years	0.36	(.11 - 1.23)	0.34	(.08 - 1.49)
25 – 29 years	0.24*	(.06 - .91)	0.39	(.06 - 2.40)
≥ 30 years	0.24	(.05 - 1.06)	0.21	(.03 - 1.67)
History of child death				
Yes (Ref. Cat.)	1		1	
No	0.71	(.43 - 1.15)	1.21	(.57 - 2.59)
Duration since diagnosis				
≤ 2 years (Ref. Cat.)	1		1	
3 – 4 years	1.48	(.79 - 2.79)	0.61	(.24 - 1.50)
5 – 6 years	1.27	(.65 - 2.49)	0.95	(.41 - 2.19)
7 – 8 years	1.60	(.84 - 3.06)	0.88	(.37 - 2.07)
9 – 10 years	1.47	(.77 - 2.81)	0.77	(.34 - 1.71)
> 10 years	1.77	(.76 - 4.14)	0.88	(.27 - 2.85)

***Significant at p < 0.05; HR- Hazard Ratio, Ref Cat: Reference Category**

Table 4.5 contd: Factors associated with parity progression: Cox Proportional Hazard Regression

	1st – 2nd HR	95% CI	2nd – 3rd HR	95% CI
Started ART				
No (Ref. Cat.)	1		1	
Yes	0.67	(.11 - 4.07)	1.53	(.32 - 7.36)
Status disclosure				
No (Ref. Cat.)	1		1	
Yes	0.80	(.41 - 1.53)	1.59	(.89 - 2.83)
Partner status				
Positive (Ref. Cat.)	1		1	
Negative	1.51	(.83 - 2.75)	1.34	(.85 - 2.10)
Unknown	1.15	(.55 - 2.41)	1.43	(.82 - 2.52)
Partner disclosure				
No (Ref. Cat.)	1		1	
Yes	0.84	(.44 - 1.62)	0.72	(.43 - 1.20)

***Significant at p < 0.05; HR- Hazard Ratio, Ref Cat: Reference Category**

Table 4.5 contd: Factors associated with parity progression: Cox Proportional Hazard Regression

	3rd – 4th HR	95% CI	4th – 5th HR	95% CI
Started ART				
No (Ref. Cat.)	1		1	
Yes	3.90	(.74 - 20.58)	0.37	(.04 - 2.85)
Status disclosure				
No (Ref. Cat.)	1		1	
Yes	1.09	(.68 - 1.76)	6.47*	(2.39-17.54)
Partner status				
Positive (Ref. Cat.)	1		1	
Negative	0.82	(.55 - 1.21)	1.23	(.69 - 2.19)
Unknown	1.18	(.69 - 2.02)	1.05	(.40 - 2.76)
Partner disclosure				
No (Ref. Cat.)	1		1	
Yes	0.75	(.42 - 1.32)	0.54	(.19 - 1.53)

***Significant at p < 0.05; HR- Hazard Ratio, Ref Cat: Reference Category**

4.6 Parity progression before and after HIV diagnosis

Given the HIV status of the women was known; the relative probability of progression from first childbirth to second childbirth was 91% and 86% before and after HIV diagnosis respectively; relative probabilities of progression to third child was 77% and 73% before and after HIV diagnosis; probabilities of progression to fourth birth before and after diagnosis was approximately 58% each; progression to fifth birth before and after diagnosis was 49% and 46% respectively; progression to sixth birth before and after diagnosis was 40% and 42% respectively; while progression to the seventh birth was almost 34% and 38% respectively, before and after diagnosis.

Table 4.6: Parity progression before and after HIV diagnosis

	1st – 2nd	2nd – 3rd	3rd – 4th	4th – 5th	5th – 6th	6th – 7th
Before HIV diagnosis	0.914	0.774	0.578	0.488	0.401	0.339
After HIV diagnosis	0.861	0.728	0.576	0.463	0.421	0.375

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter gives the discussion of the findings in this study according to the study objectives as well as conclusion, limitation of the study and recommendations of the study.

5.1 Discussion

This study has investigated parity progression and patterns of birth interval among women receiving HIV care in University College Hospital, Ibadan, Nigeria.

In this study, the estimated fertility was 4.3 children per woman of reproductive age living with HIV in Ibadan. This shows a corresponding national rate of 4.4 children per woman in South West region in 2016 according to the findings of World Population Review. However, literature has proved it that Nigeria's total fertility rate has declined to 5.3 in 2018 and sub-Saharan Africa's total fertility rate has also declined from 6.5 to 4.7 children per woman, (Organization, Unicef, & UNAIDS, 2018) Still, TFR remains high in sub-Saharan Africa countries generating continuous population growth.

This study has revealed that majority of the respondents (64%) had their birth intervals of 36 months and above, 23% had birth interval of 24 - 35 months, while few respondents (13%) had less than 24 months births interval. It was discovered that majority (72%) of the respondents were above 35 years, therefore, older women were more likely to have birth interval of 36 months and above. The median birth interval in this study was 42 months.

Women living with HIV who have reached their end of childbearing age (45-49 years) were discovered to have progressed to seventh birth order after first birth. Likewise, other age group of women living with HIV have progressed to second, third, fourth, and fifth birth from first

birth. This could be due to the fact that more than half of the respondents (53.6%) desired for more children compared to their counterparts.

In this study, desire for more children was one of the factors statistically associated with parity progression among women living with HIV. This finding is similar to what was documented by other studies. A review of the literature showed that generally, fertility preferences are proxied by desired family size, ideal number of children, and desire for additional children but due to wide availability of ART in sub-Saharan Africa, the relationship between HIV and fertility changed gradually. While many people living with HIV (PLHIV) report lower fertility intentions, researchers studied that being on antiretroviral therapy (ART) increase fertility desires (Kaida *et al*., 2009; Litwin *et al*., 2015; Maier *et al*., 2009; Myer *et al*., 2010).

Age group of mothers was one of the discovered factors associated with parity progression and birth interval in this study. It explained the hazard rate of childbearing progression was consistently and significantly lower among women age 30 years and above than those below 30 years. This revealed that younger women below 30 years were less likely to progress to the fifth birth compared to those above 30 years, and chi-square test also showed a significant relationship existed between birth interval and age of mothers. This finding is similar to what was documented by other studies conducted among HIV positive people attending anti-retroviral clinic in a tertiary health facility in Sokoto, Nigeria (Kaoje *et al*., 2015).

Another factor associated with childbearing progression was educational level as the hazard rate of progressing to third, fourth and fifth birth after second birth was higher among women with primary, secondary and higher education than those with no formal education. This finding corresponds with that of Adebowale & Palamuleni (2014) which explained that the hazard rate of

childbearing progression was higher among women with higher education than their counterparts.

The analysis revealed that partner's age was another factor significantly associated with childbearing progression and birth interval among women living with HIV. The hazard rate was consistently lower among women with older partner age 35 years and above than those women with partner below 35 years, and a significant relationship exists between birth interval and partner's age.

Furthermore, child's death was another variable associated with birth interval and parity progression probability. The study data has revealed that women who experienced child death progressed to second birth after first birth than those that did not experience child death. Previous study has also confirmed child mortality as factor affecting childbearing among the women (Ibisomi, 2017).

Other factor found to be significantly associated with parity progression and birth interval among women living with HIV was age at first birth. This finding is similar to what was reviewed in developing countries in Africa, where age at first birth has been identified as one of the factors affecting high fertility level (Guilbert, 2013; Haloi, 2014; Malhotra *et al*. 2011).

Age at first sexual intercourse and partner's education were other factors statistically associated with parity progression among women living with HIV as women progress childbearing from first birth to second birth and to higher order births. While religious affiliation, ethnicity and age at first marriage were other factors significantly associated with birth intervals among women living with HIV. This findings corresponds with previous studies that showed that ethnicity, religious affiliations, low use of contraception, and education determining the ideal family size

and influences fertility decision making among women in Nigeria (World Population Review, 2015).

The result has exposed that before women were HIV diagnosed, childbearing progression to the seventh child had occurred among HIV infected women. And even after the women were diagnosed of HIV, they progressed to having additional child. This study has revealed that large family size (TFR = 4.3) was desirable among women receiving HIV care in UCH, Ibadan, Nigeria.

5.2 Conclusion

This study has shown that age group of mothers, desire for more children, educational level of women, partner's age, history of child's death, age at first sexual intercourse, partner's education, age at first birth, religious affiliation, ethnicity and age at first marriage were the significant factors associated with childbearing progression and birth interval, and therefore results to high rate of childbearing progression among women living with HIV in Nigeria. However, child spacing can be said to be improving in Nigeria as found in this study as majority of the respondents had birth interval of at least 36 months.

5.3 Limitations

The following limitations should be considered when interpreting the results of this study.

Birth history of women was used in the computation of the parity progression ratios and birth interval. This could have introduced recall bias in this study as some women might not remember the actual date of birth of their children. Finally, the sample size of this study may affect generalization of the results of the whole population as respondents who were critically ill were allowed to withdraw voluntarily if they desire.

5.4 Recommendations

In view of the above findings, the following are recommended:

1. Campaign on the need for spacing and limiting birth should be intensified particularly in the South West. This will have a great impact on reducing the pace of population growth and fertility in Nigeria.
2. There should be extension in maternal child health services for women living with HIV in order to ensure child survival.
3. Health education should be improved for women living with HIV in the South West region, Nigeria.
4. Government and non-governmental organizations should take conscious efforts on fertility reduction intervention by encouraging women to reduce number of children they would have in their lifetime through the use of modern contraceptives and family planning methods.
5. Government should ensure resources are provided and properly channeled so as to limit the errors associated with reporting of births and to improve the vital registration system in the country.

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APPENDIX

STATA DO FILE FOR THE ANALYSIS

BACKGROUND INFORMATION

```
tab1 CEB Agegrp Q104 Religion NQ106 Q107 Q226 Q318 FERT_DESIRE Q401
AGE_MARRIED Q403 Q405 Q406 Q408 Q501Y Q503 ART_duration Q506 Q507
Partner_status ///

ethnicity diagnosis_year first_intercourse first_birth ideal_children partner_age

summarize Q201 Q202 Q320 Q404 Q505

tab1 Q201 Q202 Q320 Q404 Q505

summarize Q102

tab1 Q102

recode CEB (2/10 = 1 "Yes") (1 = 0 "No"), gen(second_birth)

recode CEB (3/10 = 1 "Yes") (1/2 = 0 "No"), gen(third_birth)

recode CEB (4/10 = 1 "Yes") (1/3 = 0 "No"), gen(fourth_birth)

recode CEB (5/10 = 1 "Yes") (1/4 = 0 "No"), gen(fifth_birth)

recode CEB (6/10 = 1 "Yes") (1/5 = 0 "No"), gen(sixth_birth)

recode CEB (7/10 = 1 "Yes") (1/6 = 0 "No"), gen(seventh_birth)

recode NQ106 (1 = 1 "Yoruba") (else = 2 "Non-yoruba"), gen(ethnicity)

recode Q501Y (2013/2014 = 1 "<= 2 years") (2011/2012 = 2 "3 - 4 years") ///

(2009/2010 = 3 "5 - 6 years") (2007/2008 = 4 "7 - 8 years") (2005/2006 = 5 "9 - 10 years") ///

(1990/2004 = 6 "> 10 years"), gen(diagnosis_year)

recode Q201 (8/13 = 1 "< 13 years") (14/16 = 2 "14 - 16 years") (17/19 = 3 "17 - 19 years")
(20/24 = 4 "20 - 24 years") (25/max = 5 "25+ years"), gen(first_intercourse)

recode Q202 (min/17 = 1 "<= 17 years") (18/24 = 2 "18 - 24 years") (25/29 = 3 "25 - 29 years")
(30/max = 4 "30+ years"), gen(first_birth)

recode Q320 (min/2 = 1 "<= 2 children") (3/4 = 2 "3 - 4 children") (5/max = 3 "5+ children"),
gen(ideal_children)
```

```
recode Q404 (min/34 = 1 "<= 34 years") (35/44 = 2 "35 - 44 years") (45/54 = 3 "45 - 54 years") (55/80 = 4 "55+ years") (98 = .), gen(partner_age)

recode Q404 (min/34 = 1 "<= 34 years") (35/44 = 2 "35 - 44 years") (45/54 = 3 "45 - 54 years") (55/80 = 4 "55+ years") (98 = 9 "Don't know"), gen(partner_age2)

recode Q401 (1 = 2 "Married") (2/4 = 1 "Unmarried"), gen(marital_status)

replace Q404 = . if Q404 == 98

replace partner_age = . if partner_age == 98

label define Q505 0 "none" 1 "one" 2 "two" 3 "three" 4 "four" 5 "five" 6 "six"

label define q2161 1 "Yes" 2 "No"

label values q2161 q2162 q2163 q2164 q2165 q2166 q2167 q2168 q2169 q21610 q2161

replace q2191 = 12 * (Q202)

generate t1 = q2191

generate t2 = max(t1, t1 + q2192)

generate t3 = max(t2, t2 + q2193)

generate t4 = max(t3, t3 + q2194)

generate t5 = max(t4, t4 + q2195)

generate t6 = max(t5, t5 + q2196)

generate t7 = max(t6, t6 + q2197)

replace third_birth = . if CEB == 1

replace t3 = . if CEB == 1

replace fourth_birth = . if CEB <= 2

replace t4 = . if CEB <= 2

replace fifth_birth = . if CEB <= 3

replace t5 = . if CEB <= 3

replace sixth_birth = . if CEB <= 4

replace t6 = . if CEB <= 4
```

replace seventh_birth = . if CEB <= 5

replace t7 = . if CEB <= 5

tab1 CEB Agegrp Q104 Religion NQ106 Q107 Q226 Q318 FERT_DESIRE Q401 AGE_MARRIED Q403 Q405 Q406 Q408 Q501Y Q503 ART_duration Q506 Q507 Partner_status ///

ethnicity diagnosis_year first_intercourse first_birth ideal_children partner_age

tab1 Q201 Q202 Q320 Q404 Q505

tab1 second_birth third_birth fourth_birth fifth_birth sixth_birth seventh_birth

tab1 second_birth third_birth fourth_birth fifth_birth sixth_birth seventh_birth if Agegrp >= 4

by Agegrp, sort: tab1 second_birth third_birth fourth_birth fifth_birth sixth_birth seventh_birth

tab1 q2161 q2162 q2163 q2164 q2165 q2166 q2167

tab1 q2161 - q2167

COX REGRESSION: FIRST TO SECOND

stset t2, failure(second_birth==0) scale(1)

stcox i.Agegrp

stcox i.Q104

stcox i.Religion

stcox ib2.Q107

stcox ib2.Q226

stcox i.FERT_DESIRE

stcox i.marital_status

stcox ib(last).AGE_MARRIED

stcox i.Q403

stcox i.Q405

stcox ib2.Q406

stcox ib2.Q408

stcox ib2.Q503

stcox ib2.Q506

stcox ib2.Q507

stcox i.Partner_status

stcox ib2.ethnicity

stcox i.diagnosis_year

stcox ib(last).first_intercourse

stcox i.first_birth

stcox i.ideal_children

stcox i.partner_age

stcox i.q2161

stcox i.Agegrp i.Q104 i.Religion ib2.Q107 ib2.Q226 i.FERT_DESIRE i.marital_status ib(last).AGE_MARRIED i.Q403 i.Q405 ib2.Q406 ib2.Q408 ib2.Q503 ib2.Q506 ib2.Q507 i.Partner_status ///

ib2.ethnicity i.diagnosis_year ib(last).first_intercourse i.first_birth i.ideal_children i.partner_age i.q2161

COX REGRESSION: SECOND TO THIRD

stset t3, failure(third_birth==0) scale(1)

stcox i.Agegrp

stcox i.Q104

stcox i.Religion

stcox ib2.Q107

stcox ib2.Q226

stcox i.FERT_DESIRE

stcox i.marital_status

stcox ib(last).AGE_MARRIED

stcox i.Q403

stcox i.Q405

stcox ib2.Q406

stcox ib2.Q408

stcox ib2.Q503

stcox ib2.Q506

stcox ib2.Q507

stcox i.Partner_status

stcox ib2.ethnicity

stcox i.diagnosis_year

stcox ib(last).first_intercourse

stcox i.first_birth

stcox i.ideal_children

stcox i.partner_age

stcox i.q2162

stcox i.Agegrp i.Q104 i.Religion ib2.Q107 ib2.Q226 i.FERT_DESIRE i.marital_status ib(last).AGE_MARRIED i.Q403 i.Q405 ib2.Q406 ib2.Q408 ib2.Q503 ib2.Q506 ib2.Q507 i.Partner_status ///

ib2.ethnicity i.diagnosis_year ib(last).first_intercourse i.first_birth i.ideal_children i.partner_age i.q2162

COX REGRESSION: THIRD TO FOURTH

stset t4, failure(fourth_birth==0) scale(1)

stcox i.Agegrp

stcox i.Q104

stcox i.Religion

stcox ib2.Q107

stcox ib2.Q226

stcox i.FERT_DESIRE

stcox i.marital_status

stcox ib(last).AGE_MARRIED

stcox i.Q403

stcox i.Q405

stcox ib2.Q406

stcox ib2.Q408

stcox ib2.Q503

stcox ib2.Q506

stcox ib2.Q507

stcox i.Partner_status

stcox ib2.ethnicity

stcox i.diagnosis_year

stcox ib(last).first_intercourse

stcox i.first_birth

stcox i.ideal_children

stcox i.partner_age

stcox i.q2163

stcox i.Agegrp i.Q104 i.Religion ib2.Q107 ib2.Q226 i.FERT_DESIRE i.marital_status ib(last).AGE_MARRIED i.Q403 i.Q405 ib2.Q406 ib2.Q408 ib2.Q503 ib2.Q506 ib2.Q507 i.Partner_status ///

ib2.ethnicity i.diagnosis_year ib(last).first_intercourse i.first_birth i.ideal_children i.partner_age i.q2163

COX REGRESSION: FOURTH TO FIFTH

stset t5, failure(fifth_birth==0) scale(1)

stcox i.Agegrp

stcox i.Q104

stcox i.Religion

stcox ib2.Q107

stcox ib2.Q226

stcox i.FERT_DESIRE

stcox i.marital_status

stcox ib(last).AGE_MARRIED

stcox i.Q403

stcox i.Q405

stcox ib2.Q406

stcox ib2.Q408

stcox ib2.Q503

stcox ib2.Q506

stcox ib2.Q507

stcox i.Partner_status

stcox ib2.ethnicity

stcox i.diagnosis_year

stcox ib(last).first_intercourse

stcox i.first_birth

stcox i.ideal_children

stcox i.partner_age

stcox i.q2164

stcox i.Agegrp i.Q104 i.Religion ib2.Q107 ib2.Q226 i.FERT_DESIRE i.marital_status ib(last).AGE_MARRIED i.Q403 i.Q405 ib2.Q406 ib2.Q408 ib2.Q503 ib2.Q506 ib2.Q507 i.Partner_status ///

ib2.ethnicity i.diagnosis_year ib(last).first_intercourse i.first_birth i.ideal_children i.partner_age i.q2164

PARITY PROGRESSION; BEFORE & AFTER HIV DIAGNOSIS

recode beforehiv afterhiv (0 = 0 "No") (1/max = 1 "Yes"), pre(child) label(newrep)

tab1 childbeforehiv childafterhiv

tab1 second_birth third_birth fourth_birth fifth_birth sixth_birth seventh_birth if childbeforehiv == 1

tab1 second_birth third_birth fourth_birth fifth_birth sixth_birth seventh_birth if childafterhiv == 1

BIRTH INTERVAL

summarize q2192 q2193 q2194 q2195 q2196 q2197 q2198 q2199 q21910

egen birth_interval = rowmean(q2192 q2193 q2194 q2195 q2196 q2197 q2198 q2199 q21910)

generate birth_interval2 = round(birth_interval,1)

drop category_birth_interval

recode birth_interval2 (min/24 = 1 "< 24 months") (24/35 = 2 "24 - 35 months") (36/max = 3 "36+ months"), gen(category_birth_interval)

egen child_death = rowmax(q2161 q2162 q2163 q2164 q2165 q2166 q2167 q2168 q2169 q21610)

label define child_death 1 "No" 2 "Yes"

label values child_death child_death

tab1 category_birth_interval

summarize birth_interval2

tabulate Agegrp category_birth_interval, chi2 column row

tabulate Q104 category_birth_interval, chi2 column row

tabulate Religion category_birth_interval, chi2 column row

tabulate Q107 category_birth_interval, chi2 column row

tabulate Q226 category_birth_interval, chi2 column row

tabulate FERT_DESIRE category_birth_interval, chi2 column row

tabulate marital_status category_birth_interval, chi2 column row

tabulate AGE_MARRIED category_birth_interval, chi2 column row

tabulate Q403 category_birth_interval, chi2 column row

tabulate Q405 category_birth_interval, chi2 column row

tabulate Q406 category_birth_interval, chi2 column row

tabulate Q408 category_birth_interval, chi2 column row

tabulate Q503 category_birth_interval, chi2 column row

tabulate Q506 category_birth_interval, chi2 column row

tabulate Q507 category_birth_interval, chi2 column row

tabulate Partner_status category_birth_interval, chi2 column row

tabulate ethnicity category_birth_interval, chi2 column row

tabulate diagnosis_year category_birth_interval, chi2 column row

tabulate first_intercourse category_birth_interval, chi2 column row

tabulate first_birth category_birth_interval, chi2 column row

tabulate ideal_children category_birth_interval, chi2 column row

tabulate partner_age category_birth_interval, chi2 column row

tabulate child_death category_birth_interval, chi2 column row

by Agegrp, sort : summarize birth_interval2, detail

by Q104, sort : summarize birth_interval2, detail

by Religion, sort : summarize birth_interval2, detail

by Q107, sort : summarize birth_interval2, detail

by Q226, sort : summarize birth_interval2, detail

by FERT_DESIRE, sort : summarize birth_interval2, detail

by marital_status, sort : summarize birth_interval2, detail

by AGE_MARRIED, sort : summarize birth_interval2, detail

by Q403, sort : summarize birth_interval2, detail

by Q405, sort : summarize birth_interval2, detail

by Q406, sort : summarize birth_interval2, detail

by Q408, sort : summarize birth_interval2, detail

by Q503, sort : summarize birth_interval2, detail

by Q506, sort : summarize birth_interval2, detail

by Q507, sort : summarize birth_interval2, detail

by Partner_status, sort : summarize birth_interval2, detail

by ethnicity, sort : summarize birth_interval2, detail

by diagnosis_year, sort : summarize birth_interval2, detail

by first_intercourse, sort : summarize birth_interval2, detail

by first_birth, sort : summarize birth_interval2, detail

by ideal_children, sort : summarize birth_interval2, detail

by partner_age, sort : summarize birth_interval2, detail

by child_death, sort : summarize birth_interval2, detail

FERTILITY RATE

egen long mostrecent_birth = rowmax(Q2141 Q2142 Q2143 Q2144 Q2145 Q2146 Q2147 Q2148 Q2149 Q21410)

recode mostrecent_birth (20029/20442 =1 "Past 12 months") (else = 0 "No past 12 months birth"), gen(birth_lastyear)

recode Q102 (15/19 = 1 "15 - 19 years") (20/24 = 2 "20 - 24 years") (25/29 = 3 "25 - 29 years") (30/34 = 4 "30 - 34 years") (35/39 = 5 "35 - 39 years") ///

(40/44 = 6 "40 - 44 years") (45/49 = 7 "45 - 49 years"), gen(age_group)

```
tab1 age_group

total CEB, over(age_group)

total CEB if birth_lastyear == 1, over(age_group)
```